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ABSTRACT

Mathematics students at the community college level have continually experienced a relatively low achievement rate when compared to their performance in other subjects. Most of the instructional strategies encountered by these students consist of the lecture-discussion-demonstration format, with no allowances made for individual difference except academic background. This paper investigates the individual teaching and learning styles of students and instructors in the mathematics department at Manatee Junior College (Florida) in terms of discovering to what extent, if any, significant differences exist in teaching/learning styles. Canfield's "Teaching Styles Inventory" and "Learning Styles Inventory," which each yield a numerical score on 17 distinct teaching/learning style preferences, were administered to six mathematics instructors and a random sample of 575 students, respectively. A comparative analysis of the learning styles scores was made on three partitions of the random sample: total sample according to final grade; according to instructor; and according to course. Results indicated that the "Learning Styles Inventory" measured uniform patterns wherever the comparison groups were considered independently. A comparison of the two inventories shows students with higher grades had learning styles more closely related to instructor teaching styles than students achieving lower grades. (Author/MB)

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A Comparative Analysis of Learning Styles and Teaching Styles of Mathematics Students and Instructors

ROY H. RAINES

A MAJOR APPLIED RESEARCH PROJECT PRESENTED
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF EDUCATION

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1976

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Abstract of a Major Applied Research Project Presented to Nova University in Partial Fulfillment of the Requirements for the Degree of Doctor of Education.

A COMPARATIVE ANALYSIS OF LEARNING STYLES AND TEACHING STYLES OF MATHEMATICS STUDENTS AND INSTRUCTORS

By

Roy H. Raines

February 1976

Mathematics students at the community college level have continually experienced a relatively low achievement rate when compared to their performance in other subjects. Most of the instructional strategies encountered by these students consist of the lecture-discussion-demonstration format, with no allowances made for individual difference except academic background. In particular, the concept of individual learning styles has not been a significant factor in the design of instructional strategies in mathematics courses. Individual teaching styles are also a factor that has been given minimal consideration.

The primary purpose of this project was to investigate the individual teaching and learning styles of students and instructors in the Mathematics Department at Manatee Junior College; and determine to what extent, if any, significant differences existed in teaching/learning styles. Findings

of the study are to be used as a basis in the development of learning strategies that consider an individual learning style.

Measuring instruments used in this study were Canfield's "Teaching Styles Inventory" (Form S-1) and "Learning Styles Inventory" (Form S-A). Each of these instruments yield a numerical score on each of seventeen distinct teaching/learning style preferences. The "Teaching Styles Inventory" was administered to six mathematics instructors and the "Learning Styles Inventory" was given to a random sample of five hundred and seventy-five students enrolled in mathematics courses during the fall semester, 1975.

A comparative analysis of the "Learning Styles Inventory" scores was made on three major partitions of the random sample: (1) the total sample partitioned according to final grade achieved, (2) the sample partitioned according to instructor, and (3) the sample partitioned according to course. In each partition the students were further partitioned according to the final grade earned (A, B, C, D, F and W) in a given mathematics course during the fall semester, 1975. All possible comparison pairs (fifteen) of these grade groups were formed. The mean and variance scores for each comparison pair were tested for significant differences by the "t" and "F" distributions respectively on each of the seventeen scales of the "Learning Styles Inventory."

In major partition two (2) the "Teaching Styles Inventory" scores were compared with the "Learning Styles Inventory" scores. This comparison consisted of testing for significant differences in the "Teaching Styles Inventory" distribution of a given instructor and the "Learning Styles Inventory" distributions of his students grouped according to final grade earned. This analysis produced a total of six comparisons for each instructor. The differences in the inventory distributions were tested by the Chi-Square distribution.

The "t" and "F" distributions yielded significant difference (at the .05 level) in fourteen percent of the comparison pairs tested. The Chi-Square distribution showed significant differences (at the .05 level) in one hundred percent of the cases.

Results of the study indicated that the "Learning Styles Inventory" measured uniform patterns whenever the comparison groups were considered independently, but not when they were considered collectively. Comparison of the "Learning Styles Inventory" and the "Teaching Styles Inventory" showed students with higher grade levels of achievement had "Learning Styles" more closely related to instructor "Teaching Styles" than the students achieving the lower grade levels.

A recommendation has been made for designing instructional strategies based on results of the "Learning Styles

Inventory."

Manatee Junior College has a recently formed "Learning Enhancement Center" that provides for time-variable mastery learning. This setting is recommended for the implementation of "individual learning packages" based on the "Learning Styles Inventory" scores. Remedial mathematics students are the target group for these "individual learning packages." If future research shows these "Learning Styles" based "individual learning packages" to be successful, consideration should be given to extending the concept to other academic areas.

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CHAPTER I

BACKGROUND AND SIGNIFICANCE

The Problem

Introduction

Traditionally, at the community college level, mathematics has been a subject in which students have experienced a relatively low success rate as compared to their performance in other subjects. As a result, general student dislike for mathematics has developed, and many students have avoided their fields of primary interest because of the mathematics requirement. This situation of low student achievement must be corrected. One possible solution to inadequate student achievement in mathematics courses, is to develop teaching strategies based upon individual learning styles.

Statement of the Problem

Assumptions. Current teaching strategies employed in community college mathematics courses are established in an a priori fashion. In most instances these strategies constitute changes in teaching style without regard to learning styles. As a result, a temporary surge is experienced in teacher enthusiasm, but no long-term gain in student achievement, is realized. More effective strategies can be devised if they are based upon individual learning needs.

Central Question. How may a basis for designing teaching strategies that are based upon individual learning needs be developed?

Existing Partial Solutions to the Problem

Partial Solution I. Since mathematics is a subject in which the content is of a cumulative nature, many efforts to improve student achievement in mathematics courses have consisted of the placement of students according to their backgrounds in mathematics. National placement norms have been developed and there are no problems in establishing the minimum mathematics background necessary for the study of a given mathematics course. However, this criterion has not been adequate for identifying those students who can successfully achieve the objectives of a given mathematics course. At Manatee Junior College, the mathematics department consistently finds students who apparently have equivalent backgrounds, and yet their achievement levels in a given course will be spread over the full range of the grading scale. This suggests that placement of students in a given mathematics course according to their backgrounds may be a necessary criterion for high student achievement, but it is by no means sufficient.

Partial Solution II. With the arrival of the so-called "modern mathematics" curriculum in the late 1950's a new emphasis on teaching strategies in mathematics was realized. However, most of the teaching strategies developed from this new direction amounted to a reorganization of content. For the most part, the content reorganization consisted of presenting material in a manner which the mathematics teachers considered to be efficient and elegant. Some attention was given to learning theories such as stimulus-response, insight, and problem-solving, but individual student differences were recognized only to the extent of differentiating between the slow and fast learner. These developments in mathematics instruction have proven to be of great value; however, they fall short of meeting the needs of students at the community college. More concern must be exhibited for the broad range of individual learning needs of the community college student body.

A Proposed Solution to the Problem

In view of the broad range of indivdual differences that currently exist in the community college classroom, it seems logical to conclude that teaching strategies should be based upon individual learning styles instead of preferences that just appeal to the teacher. If a meaningful identification of individual learning styles can be made, then a basis for developing an educational delivery system in mathematics instruction that recognizes individual needs can be established. These teaching strategies that are based upon learning styles should be used to augment existing efforts. They are not to be used as replacements for present necessary and effective techniques.

Developing teaching strategies based upon individual learning styles requires two basic steps: (1) A learning styles inventory of each student enrolled in a given mathematics course must be taken. (2) A learning prescription for the student must be devised. These two procedures must be accomplished in the order which they are numbered.

The purpose of this project was to establish a basis for typing individual learning styles that may be used to develop individual learning prescriptions. This basis was developed by obtaining the learning style preferences of students enrolled in given mathematics courses. The students were grouped according to the grades they achieved in these courses and a comparative analysis of learning styles and grade achievement was made. There was also a comparative study made of the learning styles of the students in a given course and the teaching styles of the instructor conducting the course.

The results of this analysis and comparative study may then be used as a point of departure for the implementation of step two in the teaching strategy development. Step two, the prescription writing component, was beyond the scope of this study and was not dealt with, except in a recommendation context.

General Support for the Proposed Solution

Hill (1971, p. 3) supports the proposed solution by claiming that ninety percent of the students with normal ability can learn ninety percent of the material ninety percent of the time if the teaching methods and media are adjusted to the students' learning styles. In summarizing his study, Steinke (1974) concludes: "The research demonstrates that there is a viable construct known as cognitive style, that it can be documented and that there are potentials for its application in education and other settings."

In describing an effective curriculum, the National Council of Teachers of Mathematics recognizes the need for providing for individual learning styles. "An effective curriculum is one that expands in such a variety of ways that individual differences become greater as students progress through the grades. Differences in intelligence, learning style, and specific kinds of mathematical understanding; differences in learning rate; and differences in vocational goals should be provided for," National Council of Teachers of Mathematics, 1965. With the exception of learning styles, all of the factors are considered in the design of community college mathematics courses. Therefore, it appears that the time has come to make learning style an integral factor in the design of mathematics curricula.

Researchers in the area of cognitive style believe that cognitive style can play a meaningful role in education. Witkin (1973, p. 1) states: "Perhaps the most promising and exciting prospects for a cognitive-style approach lie in the field of education. While relatively little research has been done, compared to what is possible and needed, it is already clear that cognitive style is a potent variable in students' academic choices and vocational preferences; in students' academic development through their school, and in how students and teachers interact in the classroom." In this research context, it is expected that this study will provide some of this currently needed research in the area of cognitive style. In particular, this study had the learning styles of community college mathematics students as its target.

Sperry (1972, p. 99) provides commentary that supports the need for designing instructional strategies that are based upon individual learning styles. The message is simple. The teacher can know the best ways to guide the learner only if the learner is observed in his environment. That is, the teacher must know how the learner struggles to receive, analyze and retain information. This activity was precisely the goal in this study.

Cross (1974) is another strong proponent of the use of learning styles in designing teaching strategies. Cross maintains that cognitive style permits both students and teachers maximum opportunity to develop the teaching/learning styles that are effective for them. The typing of learning/teaching styles as mentioned earlier in this paper should be a first step in the improvement of instruction that is suggested by Cross.

Support for basing teaching strategies on individual learning styles is also given by the research psychologist Jonathan Warren (1974) who states: "New means of accommodating student diversity are clearly needed, and one approach is to assess the personal preferences or learning styles of the student and adopt instructional procedures accordingly." This assessment of learning styles mentioned by Warren, is the purpose of the learning styles inventory referred to in step one of the proposed solution to the stated problem.

Warren (1974) also contends that differing styles in learning and teaching can be identified consistently and can be used as guides to instructional methods. He also maintains that a complex means of assessing and analyzing student and faculty characteristics are not necessary. He states: "A simple questionnaire survey of student preferences throughout an institution, a program, or a department would indicate the proportion of students strongly inclined toward one instructional approach or the other."

Measuring Instruments to be Used

Canfield (1973) has developed an instrument for measuring learning styles that is of the type described by Warren. The Canfield instrument is a questionnaure survey that measures preferences in learning styles. Reliability scores of the measurements of the Canfield instrument are available, and it can be administered without extensive student and staff orientation. Therefore, in view of the practical considerations, the Canfield (1973) "Learning Styles Inventory-Form S-A" (Appendix I) has been selected as a data gathering instrument for this research project.

To gain maximum benefit from knowledge about the "learning styles" of students, there should be corresponding knowledge of the "teaching styles" the students will encounter. Thus, a second objective of this study was a measurement of the teaching styles preferred by the teachers of those students whose learning styles were measured. According to Cross (1974) cognitive style permits both students and teachers maximum opportunity to develop the teaching/learning styles that are effective for them.

The "teaching styles" were measured by an instrument recently developed by Canfield (Publication - Fall, 1975) (Appendix II). This instrument parallels the "Learning Styles Inventory" (Form S-A) and thus provides a comparative analysis basis of "learning styles" in the context of given "teaching styles."

MAJOR QUESTIONS AND HYPOTEHSES

Definition. The term "course" means a mathematics course taught at Manatee Junior College during the fall semester, 1975.

Definition. The term "student" means an individual enrolled in a mathematics course at Manatee Junior College during the fall semester, 1975.

Definition. The term "instructor" means an individual teaching a mathematics course at Manatee Junior College during the fall semester, 1975.

Definition. If student A and student B are enrolled in a given mathematics course C, then A and B are said to have varying grade levels if and only if the final grade achieved by A in course C is different from the final grade achieved by B in course C.

The hypotheses given are in reference to each of the stated questions and they are the general forms that were applied to each of the learning/teaching styles that were measured.

1. Whenever all the mathematics students are considered collectively, is there a difference in the learning styles of students who achieve varying grade levels?

2. Whenever the mathematics students are grouped according to instructor, is there a difference in the learning styles of students who achieve varying grade levels?

   Forms of the hypotheses that are to be tested for questions 1, 2 & 3:

   A. There is no significant difference in the mean score, U_x of group x and the mean score, U_y of group y.

      Null Hypothesis: $U_x = U_y$

      Alternative Hypothesis: $U_x \neq U_y$

   B. There is no significant difference in the variance, S_x^2 of group x and the variance S_y^2 of group y.

      Null Hypothesis: $S_x^2 = S_y^2$

      Alternative Hypothesis: $S_x^2 \neq S_y^2$

3. Whenever the mathematics students are grouped according to course, is there a difference in the learning styles of students who achieve varying grade levels?

4. To what extent does a consistency exist between teaching styles and learning styles when compared by instructor and grade achievement?

4. (continued)

Hypotheses forms for question 4: Is there a consistency between learning style Z and teaching style X?

Null Hypothesis: $P(Z_i) = P(X_i)$

Alternative Hypothesis: $P(Z_i) \neq P(X_i)$

The symbol Z represents the "Teaching Style Inventory" measurements of instructors one through six, and the symbol X represents the "Learning Style Inventory" measurements of students achieving the grade levels of A, B, C, D, F, and W. The symbols $P(Z_i)$ and $P(X_i)$ represents the probability distributions determined by the "Teaching Styles Inventory" and "Learning Styles Inventory" respectively.

DATA COLLECTION

Research data for this study was collected in the Mathematics Department at Manatee Junior College from 1149 students enrolled in mathematics courses during the fall semester, 1975. A random sampling process was used to select 575 of these students as participants in the study.

Two types of data were collected from the sample: (1) the final grade achieved in the course in which they were presently enrolled and (2) their learning styles as measured by the "Learning Styles Inventory" (Form S-A). The students' grades were collected from the registrar's office at the end of the fall semester. The "Learning Styles Inventory" was administered during a regularly scheduled class meeting during the time interval of September 5, 1975 to September 25, 1975. The time required to complete the inventory was approximately forty minutes.

There were six full-time instructors in the mathematics department and all agreed to participate in this study. These instructors were given a "Teaching Styles Inventory" (Appendix II) similar to the "Learning Styles Inventory" (Appendix I). The "Teaching Styles Inventory" was administered on an individual basis rather than a group setting as was the case with the "Learning Styles Inventory."

DATA ANALYSIS

Since a great quantity of data was collected in this study, all numerical information was recorded on IBM punch-cards for computer processing. The punch-card recording system was used because of its sorting capability.

The data gathering instrument, "Learning Styles Inventory" (Form S-A) is composed of thirty items, each of which required the person taking the inventory to read four options and to rank the options in the order in which they describe their preferences or feelings. Each item required the person to rank on an integral scale of one through four, four responses, and, in essence, was the equivalent of six paired comparison items where the person selects one item from each pair.

The inventory was scored by summing the individual item values for each category of the inventory. This procedure yielded seventeen different numerical scores. Sixteen of which measure specific learning styles, and the seventeenth is an expectancy score.

The inventories were sorted according to the grade achievement: A, B, C, D, F, and W of the students. For each grade level of achievement, the mean and standard deviation were computed. The t-distribution was used to compare the means of the different groups. The variance scores of the groups were compared by the F-distribution.

Similar comparisons of the inventories were made by partitioning the sample according to course and instructor.

The "Teaching Styles Inventory" that was used as the instrument for measuring the teaching styles of the instructors is similar in structure to the "Learning Styles Inventory," the primary difference being that the seventeen categories are measured with twenty-five questions on the "Teaching Styles Inventory" as compared to thirty questions on the "Learning Styles Inventory." The scoring procedures of the two inventories are the same.

A consistency analysis was made between teaching styles and learning styles according to instructor and grade achievement. This analysis was conducted with the techniques presented by Yamane (1964, Ch. 20).

IMPLICATIONS

Data derived from this study will serve as a basis for the design of individualized instruction strategies in the area of mathematics. The first planned application of the findings of this study is an implementation of a learning styles based diagnostic and prescription writing component of the newly formed "Learning Enhancement Center" at Manatee Junior College. This application will initially be limited to the remedial mathematics students using the "Learning Enhancement Center." However, it is expected that it eventually will be applied to other academic areas.

Although the findings of this study are related specifically to mathematics students there are certain parameters such as norm scores and comparison statistics that will be helpful in the judgment and design of educational delivery systems in areas other than mathematics. It is also hoped that it will serve as a basis for the design of other field studies of learning styles.

CHAPTER II

THE INSTRUMENTS

Introduction

In this chapter a discussion of the data gathering instruments used in this study will be given. These instruments are: (1) "Learning Styles Inventory" (Form S-A), and (2) "Teaching Styles Inventory" (Form S-1). These instruments appear in Appendix I and Appendix II respectively.

Most of the discussion will be directed toward the "Learning Styles Inventory." The "Teaching Styles Inventory" parallels the "Learning Styles Inventory" on an item by item basis. The primary difference is that the items are written from the teacher's viewpoint on the "Teaching Styles Inventory," whereas they are written from the student's viewpoint on the "Learning Styles Inventory."

The discussion is presented in two parts: (1) a general description of the scales, and (2) an interpretation of the scales. The description of the scales includes their identification and definitions. The interpretation of the scales amounts to a suggested use of the results of the "Learning Styles Inventory" in a formal classroom setting and in a coaching situation.

The remarks on the interpretation of scales are in the context of the mathematics students used in this study. However, they could be generalized to other educational settings. Canfield (1974, pp. 29-44) has a more general discussion of these scales.

Identification and Definitions of Scales

The "Learning Styles Inventory" is composed of thirty items. Each item requires the person taking the inventory to read four options and to rank these options in the order which best describes their preferences or feelings. The rank ordering of the four responses on each item is the equivalent of six paired comparison items where the respondent selects one item from each pair.

The "Learning Styles Inventory" was administered on an untimed basis. The average time required for a student to complete the inventory was about forty minutes. Item responses were recorded on a separate answer sheet (Appendix III). The answer sheets were scored by computer, but hand scoring would have been feasible with a smaller sample. The average time required to hand score an answer sheet was about three minutes.

There are four major categories of the "Learning Styles Inventory:" (1) Conditions, (2) Content, (3) Mode, and (4) Expectation. These categories are further partitioned into sub-categories, each of which reflects a related sub-score. The calculation of the sub-scores is illustrated in Appendix IV.

In order to facilitate the discussion of the categories (scales), a symbolic representation of each category will be established. The following chart gives the symbolic assignments.

TABLE I

SYMBOLIC REPRESENTATION OF THE LEARNING STYLES INVENTORY CATEGORIES

Symbol	Category (Scale)
CAP	Condition: Affiliation - Peer
CAT	Condition: Affiliation - Teacher
CSO	Condition: Structure - Organization
CSD	Condition: Structure - Detail
CAG	Condition: Achievement - Goal Setting
CAI	Condition: Achievement - Independence
CEC	Condition: Eminence - Competition
CEA	Condition: Eminence - Authority
CN	Content: Numeric
CQ	Content: Qualitative
CI	Content: Inanimate

TABLE I (continued)

Symbol		Category (Scale)
CP		Content: People
ML		Mode: Listening
MR		Mode: Reading
MI		Mode: Iconic
MD		Mode: Direct Experience
EA	E	Expectation: Superior Level
EB		Expectation: Good Level
EC		Expectation: Satisfactory Level
ED		Expectation: Unsatisfactory Level

The following descriptions of the "Learning Styles Inventory" scales are, in essence, those given by Canfield (1973, pp. 4-6).

The Scales Defined

I. Conditions:

The first eight scores on the "Learning Styles Inventory" answer sheet, as indicated in Appendix IV, are generated from the conditions category. These scores are in response to four major fields, each of which reflects two related sub-scores.

A. Affiliation: Friendly, warm, supportive relations with others.

A. (continued)

CAP. Peer: Working in student teams; good relations with other students; having student friends, etc.

CAT. Teacher: Knowing the teacher personally; having a mutual understanding; liking one another.

B. Structure: Logical, orderly, well-defined and clear study plans.

CSO. Organization: Course work logically and clearly organized; meaningful assignments and sequence of activities.

CSD. Detail: Specific information on assignments, requirements, rules, etc.

C. Achievement: Independence of action; pursuit of own interests; self-set objectives in relation to self-perceived capabilities and interests.

CAG. Goal Setting: Setting one's own objectives; using feedback to modify goals or procedures; making one's own decisions on objectives.

CAI. Independence: Working alone and independently; determining one's own study plan; doing things for oneself.

D. Eminence: Comparing oneself to others; competing for recognition; having situations controlled; dealing with authority.

D. Eminence: (continued)

CEC. Competition: Desiring comparison with others; needing to know how one is doing in relation to others.

CEA. Authority: Desiring classroom discipline and maintenance of order; having informed and knowledgeable teachers.

II. Content: Major areas of interest.

CN. Numeric: Working with numbers and logic; computing, solving mathematical problems, etc.

CQ. Qualitative: Working with words or language; writing, reading, editing, talking.

CI. Inanimate: Working with things; building, repairing, designing, operating.

CP. People: Working with people, interviewing, counselling, selling, helping.

III. Mode: General modality through which learning is preferred.

ML. Listening: Hearing information; lectures, tapes, speeches, etc.

MR. Reading: Examining written word; reading texts, pamphlets, etc.

MI. Iconics: Viewing illustrations, movies, slides, pictures, graphs, etc.

MD. Direct Experience: Handling or performing; shop, laboratory, field trips, practice exercises, etc.

Scoring the Learning Styles Inventory

The inventory is scored by calculating the summation of the individual item values in each category. The answer sheet (Appendix III) has been constructed so that the six item values in each category are arranged in horizontal rows. For example, the summation of the numerical values assigned to item responses 1a, 6a, 11a, 16a, 21a and 26a yields a score for one category. This score is placed in the column marked "do not write in this column." This horizontal summation process is continued until a score for each row is obtained. Each of the scores obtained for the first sixteen rows is a numerical measure for a category. The scores obtained in the last four rows are combined algebraically to form one score for the Expectation Category. The Expectancy Score equals three times the seventeenth row score plus the eighteenth row score minus the twentieth row score.

A specially coded form of the answer sheet is given in Appendix IV. This form identifies the category represented by each row and it also provides a symbolic explanation of the scoring procedures.

Since the scores represent a ranking process, stronger preferences are indicated by lower numeric scores. The strongest preference in a given category would be represented by the lowest possible numeric score, which is six. The weakest preference in a given category would be represented by the highest possible numeric score, which is 24. In essence, a low score in a given category implies an area of attraction for the student, whereas a high score in a given category implies an area of potential avoidance for the student.

Graphical Display of the Learning Styles Inventory Scores

Canfield (1973, p. 8) recommends two types of graphic displays of the "Learning Styles Inventory" scores: (1) a criterion referenced (raw score) profile, and (2) a norm referenced (percentile) profile. The forms for these profiles are given in Appendix V and Appendix VI respectively.

The criterion referenced (raw score) profile indicates how the respondent ranked the various areas in relation to each other. The norm referenced (percentile) profile provides a basis for judging a respondent's preferences relative to a given group.

Score Reliabilities

The reliability scores, that were available at the time of this study, for the "Learning Styles Inventory" are given in the following table. The source of the table is Canfield (1973, p. 11).

TABLE II

SCORE RELIABILITIES

Category	Score
CAP	.59
CAT	.71
CSO	.50
CSD	.69
CAG	.52
CAI	.64
CEC	.57
CEA	.66
CN	.83
CQ	.75
CI	.78
CP	.73
ML	.67
MR	.78
MI	.68
MD	.79
EA	.72
EB	.47
EC	.66
ED	.70
Expectancy Score	.92

Scoring and Analysis of the Teaching Styles Inventory

The "Teaching Styles Inventory" has a structure that parallels the "Learning Styles Inventory" on an item by item basis. Thus, the previous remarks (with the exception of the score reliabilities) on the "Learning Styles Inventory" apply to the "Teaching Styles Inventory."

The primary difference in the inventories is that the "Teaching Styles Inventory" measures preferences with twenty-five questions, instead of thirty questions as is the case with the "Learning Styles Inventory." Since the same categories are measured in both inventories, the "Learning Styles Inventory" answer sheet can be used to record and score the responses to the "Teaching Styles Inventory." The only adjustment needed is to ignore the last column of the answer sheets in Appendix III and Appendix IV. This will, of course, result in the highest possible preference for a given category being represented by a score of five, and the lowest possible preference being represented by a score of twenty.

The graphical representation of the Teaching Styles Inventory" score can be done by using the profile forms given in Appendices V and VI. The only adjustment needed is to change the range of the Raw Score Profile (Appendix V) from a "six to a twenty-four" interval to a "five to twenty" interval.

Scale Interpretations of the Learning Styles Inventory

Introduction

This discussion deals with the utilization of the scores resulting from students' responses to the "Learning Styles Inventory." This utilization will, in essence, be the writing of "learning prescriptions" that can be effectuated through either a formal classroom setting or a coaching situation.

In the following discussion interpretations of each of the seventeen categories (scales) of the "Learning Styles Inventory" will be considered individually. These interpretations will constitute, in part, a basis for the recommendations made in Chapter V of this study.

I. Conditions:

Affiliation - Peer (CAP)

A high preference on this scale indicates that the respondent views the development and maintenance of warm, friendly inter-personal relations with individuals in his same situation or group, as an important aspect in his learning environment. The comparisons made indicate that this condition for growth is more important than a logically or carefully developed study plan. This condition is more important than the opportunity to establish one's own objectives and goals. It is more important than competition with others.

In the formal classroom setting, the activities most likely to be acceptable are: small group discussions among students; student team projects, cooperative study or project work; and class projects.

In the coaching situation, the individual may be concerned with developing and maintaining warm supportive relationships with peers. The individual may be expected to respond positively to a peer tutoring program.

Affiliation - Teacher (CAT)

A high preference on this scale indicates that the respondent has consistently shown a preference for situations in which a friendly, warm personal relationship is established and maintained between the teacher and the students. This expressed concern was compared with the individual's concern for detailed information about the learning assignments; the desire to work independently, and the need for authority in the learning environment.

In the formal classroom setting, the individual is likely to favor a degree of informality in address and association, and private-helpful rather than investigative-tutorial relationships. The instructor will be most effective when functioning in a helping and supporting fashion, rather than in an evaluative or judging manner.

In the coaching situation, the individual's needs to be considered and treated on a friendly, warm, and personal basis should be considered. The use of small informal sessions would be helpful in developing the personal relationship that individuals with strong preferences in this area find gratifying and stimulating.

Structure - Organization (CSO)

High preference on this scale indicates a desire for information about the sequence of events in a developmental process. It is important that the individual know why the events are occurring in the order or manner utilized. Strong preference in this area indicates that the "how and why" of events in the development process is more important for an effective learning situation than warm relationships with other students. It is also more important than the opportunity to establish one's own goals and the opportunity to compete with others.

In the formal classroom setting, individuals are likely to desire logical and systematic coverage of the material and a clear and understandable path for development. Students indicating a strong preference for organization are likely to appreciate and work effectively with topical outlines, course outlines, chapter outlines, lecture note outlines and similar materials. The teaching strategies should emphasize a logical developmental pattern of the learning experience. Presentations should be well organized and without diversions into unrelated topics.

In the coaching situation, individuals with a strong preference for organization are likely to want precise and complete explanations on concepts with which they need assistance. Full explanations on how various concepts are related, and on how a specific assignment is related to a performance objective would be well received. It is important that these individuals know how one developmental experience relates to, builds upon, or aubments other experiences.

Structure - Detail (CSD)

A high preference on the "CSD" scale indicates that the individual has consistently expressed a preference for knowing what is precisely expected of the learner in a given learning experience. This concern was selected as more important than warm, friendly relations with the teacher. It is more important than the opportunity to work independently. This concern is also of more significance than the desire for control of the learning situation by knowledgeable and capable instructors. High preferences on the "CSD" scale indicate that the respondent is especially desirous of specific information about what is to be accomplished, how it is to be done and how it will be evaluated.

In the formal classroom setting, the respondent with high "CSD" preferences is likely to respond positively to written information about assignments and clear descriptions about events that are likely to happen. The individual is also likely to be desirous of specific detail on the length, form, and general content of examinations. A strong desire of specifics on how and when evaluations are to be made, may be expected by the individual who exhibits a high preference on the "CSD" scale.

In the coaching situation, the individual is inclined toward a desire for a step by step explanation of the concept in which assistance is needed. The strong need for detail can be confused with dependence or ignorance. However, this may merely be a reflection of the individual's concern with not wasting time or energies doing improper, incorrect, or useless activities.

Achievement - Goal Setting (CAG)

Strong preferences on the "CAG" scale reflect the individual's selection of responses which indicate that the option of identifying and pursuing goals of his immediate and specific interest is of primary importance. The individual with a high preference on the "CAG" has consistently selected the items of this scale as being more important than those items representing good student inter-personal relationships, a clear and logical organization of the learning experience, and a strong authority relationship between the teacher and the students. Individuals who have strong preferences in "CAG" area are characterized by wanting to establish goals and objectives that are meaningful for them; and for getting objective and frequent feedback on their progress.

In the formal classroom setting, individuals with strong preferences for goal setting are inclined to desire opportunities to establish their own objectives and/or goals in their learning environment. They prefer to consider a situation in relation to their self-perceived capabilities and interests before determining their objectives. The parameters most often used in setting objectives are amount of time, amount of work, length of assignments and other quantitative constraints.

In the coaching situation, an awareness of the individual's needs for "perceived reality" should be maintained. The individual should be given the opportunity to make decisions about what is to be accomplished, to what level, and to what point in the developmental process. Imposed goals which appear unrealistic in terms of the individual's perceived needs and capabilities should be avoided.

Achievement - Independence (CAI)

High preferences in the "CAI" area reflect the individual's consistent selection of responses that indicate the importance of working independently and doing things on one's own. Persons with strong preferences in this area have chosen item responses which provide them with considerable personal freedom in the establishment of the ways and/or means they will utilize to achieve their goals.

In the formal classroom setting, individuals with high independence preferences are likely to respond favorably to independent study, particularly where a selection may be made from several alternatives. Their preference for independence can be misinterpreted as a rejection of direction or as obstinance. However, in effect, the highly independent learner may be expressing a confidence in his own ability to identify and utilize the process and information that will be most useful to him. The learner who ranks high on the "CAI" preference scale is likely to respond favorably to independent assignments, out of class work and non-group activities.

In the coaching situation, the student's preference for making decisions about how learning and development can best be accomplished should be considered. A highly structured and demanding sequence of activities is likely to be less effective than activities where objectives are identified and the individual is given several options or alternatives from which to choose for his accomplishment.

Eminence - Competition (CEC)

High preferences on this scale indicate that the individual has consistently indicated that some basis for comparing performance with others is important to effective learning. The comparison needs represent a type of "outer directedness" in which the individual makes judgments about their own performance on the basis of how it compares with others. In obtaining a high preference in the "CEC" area, the individual had to indicate that competition and comparison with others was relatively more important than warm and friendly relations with other students. It was also more important than logical and orderly coverage of material, and more important than the opportunity to set one's own goals.

In the formal classroom setting, the typical situation in which the teacher asks different students questions, and asks students to volunteer if they know the answer is likely to appeal to the competition minded. Similarly, a statistical discussion of test scores is likely to appeal to the "CEC" oriented student.

In the coaching situation, the establishment of an interpersonal comparison base is likely to be viewed as a meaningful component of the individual's learning experience. The student with a strong "CEC" performance is likely to feel this progress can not be meaningfully measured unless there is a "typical others" base with which comparison can be made. Failure to recognize this need could leave the student feeling that his progress was inconsistent with the facts, since persons are likely to invent their own competition if no base is provided for comparisons.

Eminence - Authority (CEA)

Strong preference on the "CEA" s[illegible]e indicate that the student is particularly concerned with a well-controlled formal learning environment. There is a desire for the exercise of authority both in controlling the environment and in providing the solutions and/or idea in class.

In the formal classroom setting, the student is more likely to prefer lectures by recognized authorities, and solutions from the instructor rather than the other students. Strong positions of controlling the learning activities, classroom events and the direction of difficult tasks in a no-nonsense way are likely to be well received.

Extensive class discussion sessions may not be received favorably by the individual with a high "CEA" preference.

In the coaching situation, the high authority preference individual will respect the coach for having the answers he is supposed to have. The sharing of information and the objective monitoring of progress will be well received by the student with a strong "CEA" preference. The student also expects the coach to exercise his prerogatives and give tough assignments when needed.

II. Content

Numeric (CN)

Strong preference in the "CN" area indicate that the student prefers studies and learning activities that involve the scientific method and mathematical concepts. This interest was compared to preference for studies involving words or language; working with or designing things; or in interacting with people.

In the formal classroom setting, persons with strong "CN" preferences are likely to possess a high degree of internal motivation toward the content of mathematics courses. This individual may respond favorably to enrichment topics of a mathematical nature. Persons with a low "CN" preference might signal a need to carefully motivate the student in mathematics courses, or to provide tutorial help, or to assure early performance success.

In the coaching situation, students with a high "CN" preference are likely to view the coach as a resource person. These students are inclined to identify their problem areas themselves and thus expect the coach to provide assistance in these specific areas. Students with low "CN" preferences may require a considerable amount of motivating as well as help in coping with mathematical content.

Qualitative (CQ)

A high preference in the "CQ" area reflects a preference for dealing with words. Learning activities which involve the language of conversation is of great interest and reflects itself in writing, talking, editing, etc. High preferences for these kinds of activities represent a selection over activities involving mathematical concepts, working with objects, and in dealing with people in a social inter-active relationship.

In the formal classroom setting, the student with a strong "CQ" preference is likely to prefer conceptually imprecise discussions. Learning activities that involve the preparation of critiques or reviews of positions, and discussions in which differing views can be developed are apt to be well received.

In the coaching situation, the individual is more likely to be interested in the how's and why's of a situation than the specific input or resultant variables. The student with a high "CQ" preference may have a tendency to concentrate on understanding the general concept, but neglect the details of the components that constitute the general concept.

Inanimate (CI)

Strong preferences in this area indicate that the student has consistently ranked items involving the repair, design, or operation of equipment over the other variables of the content section. That is, the individual has shown a preference for working with things, as opposed to people, or numbers, or language.

In the formal classroom setting, individuals with strong inanimate preferences are apt to be most absorbed with pieces of equipment, working models, simulators, etc. The use of geometric models to introduce and explain new mathematical concepts is likely to be received favorably. The use of calculating devices is also likely to be well received by the student with a high "CI" preference.

In the coaching situation, individuals with strong "CI" preferences are likely to respond favorably to activities that are pragmatic in nature. The coach may be successful in illustrating difficult concepts through the use of real-world examples. Examples that relate to the function, operation, and design of machines are likely to be well received.

People (CP)

A high preference on the "CP" scale indicates that the individual is inclined toward activities that involve other people. The choices made in arriving at a high "CP" preference were comparisons to working with numbers reading or writing, and building or repairing things. In most instances, given a choice of activities one of which involved doing something for or with others, the individual selected the people contact activity over the other three. The activities selected are those associated with working around or with people, not necessarily in working with them in a friendly and mutually supportive way.

In the formal classroom setting, strong preferences in the "CP" area suggest that the "people" side of a concept is likely to receive more emphasis than the "task" side. Topics involving the human relations or human resource management are likely to be of greatest interest and the most quickly accomplished.

In the coaching situation, strong people interests indicate a desire to work with them to understand them, but not necessarily an ability or skill in working with people. The use of examples that relate to human needs is likely to be well received.

III. Mode:

Listening (ML)

High preferences in the "ML" area, in relation to the other scales in the mode section, indicate that the individual has consistently preferred the auditory or listening sensory channel as the one through which learning is preferred. Listening, as a mode for learning, has been preferred over Reading, Iconics, and Direct Experience.

In the formal classroom setting, the individual clearly desires a preference for hearing concepts explained or presented, as opposed to reading about them, seeing representations of them, or handling them or working with them directly. High "Listening" scores combined with strong preference for "Authority," are descriptive of individual satisfaction with the lecture format of instruction. Utilizing audio tapes for self-study with the "ML" individual that is also high in Independence would also be reasonable.

In the coaching situation, students with high "ML" preferences are most likely to be comfortable and productive with the coach, peers or others with whom talk is possible and feasible. High listening scores suggest that personal contact time between the coach and the individual is likely to be of great importance to the person's development. The time should be utilized wisely and carefully as it is likely to have higher impact than with people having less concern for learning by listening.

Reading (MR)

High preferences on the "MR" scale indicate that the individual prefers to accomplish learning through study of printed materials such as books, magazines, pamphlets and articles. This way of learning is preferred to hearing things, or in viewing things, or in dealing with the material in a direct and personal way.

In the formal classroom setting, the student will prefer assignments which can be handled through conventional textbook or library work procedures. Depending upon the skill of the reader, and his preference in the condition category of the inventory, the student may be uncomfortable in the typical lecture environment. He may prefer the opportunity to get different expert viewpoints, and to cover the material more quickly and thoroughly by reading.

In the coaching situation, the student is likely to respond well to written materials pertaining to enrichment activities. Such students, particularly with strong Organization and Detail preferences, are likely to function quite adequately in the use of monographs and hand-outs. They are also likely to respond favorably to written critiques of their papers.

Iconics (MI)

High preferences on the "MI" scale indicate a desire for learning activities which involve some graphic or pictorial representation of the topics being studied. Iconics, in this inventory, includes all variety of non-word media such as videotapes, movies, charts, graphs, displays, talking pages, slides, etc. Persons indicating strong preferences in the "MI" area are expressing a need to see concepts in forms where inter-relationships and visual expressions other than language are utilized. Very high preferences indicate that the individual feels these types of materials are more important than speeches, books, and actual contacts with material directly.

In the formal classroom setting, individuals with strong "MI" preferences are likely to adjust well to visuals of nearly all varieties. For students preferring to work alone, such self-study techniques as carrel-based audio-visual programs are likely to be acceptable and productive. The lack of visual representations can be quite frustrating to persons having high "MI" preferences. This is particularly true in cases where most of the material is presented in lecture or conversation.

In the coaching situation, the iconically oriented individual is likely to be most sensitive to teaching strategies which illustrate or portray the situation in some graphic or pictorial form. Asking for reports which include visual representations are likely to bring out the best in the student and give him a chance to utilize a preferred learning mode to demonstrate the learning accomplished.

Direct Experience (MD)

High preference on the "MD" scale indicates a desire for learning situations in which they can work or actually contact the materials, topics, or situations being studied. This mode of learning has been preferred in comparison to the other modes of listening, reading and iconics. Direct Experience can be interpreted to mean some form of actual contact with the subject matter rather than dealing with some representation of the topics in language or iconic form.

In the formal classroom setting, the student is most likely to enjoy real-life contact with the subject. This could entail laboratory work, actual research with the subject matter or the operation of equipment such as calculators and computers. This type of student is likely to prefer case studies, reports of actual circumstances and events, rather than an interpretation by someone else.

In the coaching situation, the student with strong "MD" preferences is likely to view the coaching aspect of learning as being more important than the classroom experience. The satisfaction associated with "doing" may make it difficult for the student to keep up with readings, or for them to gain full value from classroom presentations or speeches. Nearly every contact between the coach and the Direct Experience student has consequence because of its reality. The person with high "MD" preferences may "model," that is, to mimic or imitate the behaviors and work habits of the coach.

IV. Expectations:

Superior Level (EA)

High preference on the "EA" scale indicates that the student anticipates doing excellent or superior work in the learning situation.

Good Level (EB)

High preference on the "EB" scale indicates that the student expects to perform at an above average level in the learning situation, but not necessarily at a superior level.

Satisfactory Level (EC)

Strong extensions on this scale indicate that the student is anticipating about average level performance in the learning situation.

Unsatisfactory Level (ED)

Strong extensions on the "ED" scale represent a prediction of doing poorly or failing in the achievement of the learning objectives.

To obtain a more meaningful interpretation of preferences in the Expectations category, the scores of the four sub-categories are combined in a single score, called the Expectancy Score. The Expectancy Score is defined in the following equation.

$$\text{Expectancy Score} = 3(EA) + (EB) - (ED).$$

The range of the Expectancy Score is from six (the highest level of success predicted), to eighty-four (the lowest level of success predicted).

Generally, the student who predicts failure, or substantially less success in the learning situation than similar others, needs particular concern early in the learning experience.

In the formal classroom setting, the provision of failure proof experiences that can help the student change the concept of personal potential may generate a different set of expectations and motivations in the learning situation.

In the coaching situation, a marked difference between the student's predicted level and actual level of success may suggest an early discussion of performance and resolution of problems rather than letting them pass or accumulate.

Additional Comments on Scale Interpretations

In order to write a learning prescription based upon the measurements gained from the "Learning Styles Inventory," the results of the inventory must be interpreted by considering the inter-relationships of all categories. In Appendix VII there is an "Instructional Activity Matrix," Canfield (1973, p. 47) that suggests possible teaching strategies that are based upon high student preferences as indicated by the "Learning Styles Inventory."

Scale Interpretations of the Teaching Styles Inventory

As mentioned previously, the structure of the "Teaching Styles Inventory" parallels that of the "Learning Styles Inventory." Therefore, in order to interpret the preferences indicated on the "Teaching Styles Inventory," one only has to change from the context of student to teacher.

Summary

There were two data gathering instruments used in this study. The "Learning Styles Inventory" (Form S-A), and the "Teaching Styles Inventory" (Form S-1). These instruments were administered on an untimed basis, with an average completion time of approximately forty minutes. The instruments were scored by computer.

The instruments are parallel in structure and consist of four major categories that are further sub-divided to produce seventeen preference scores. These score categories (scales) have been defined and their implications for teaching/learning strategies have been discussed.

Suggestions for graphical displays of the results have been made. Suggestions of specific instructional activities, as they relate to specified high learning style preferences, have also been made.

CHAPTER III

PARAMETERS OF THE SAMPLE

Introduction

The purpose of this chapter is to describe the basic characteristics of the sample (see Chapter I) used in this study. By design, the sample was of heterogenous composition. However, certain variable quantities of the sample were identified and controlled.

Basically, there were three parameters used to characterize the students in the sample: (1) the courses in terms of their performance objectives, (2) the courses in terms of their prerequisites, and (3) the final grades in terms of their definitions for a given course.

These parameters define the extent to which the variables in the sample were controlled. Other variables such as instructor, meeting time of the class, part-time students, full-time students, age, sex, and major field of interest, were not controlled. However, since the sample was randomly generated and relatively large, there was no serious concern about obtaining a biased representation in terms of these variables.

Since there was considerable latitude in the scope and extent of the courses from which the random sample was drawn, meaningful interpretation of the learning styles inventories required that the context of given courses be observed. Therefore, this chapter serves, in part, as a basis for the conclusions and recommendations section of this study.

The following discussion consists of the definitions of the three parameters previously identified. These definitions will be presented as they apply to each of the eleven different courses used in this study.

Math 100

Performance Objectives

The student must have performed with a degree of accuracy of at least eighty percent, in order to have achieved the stated performance objectives for Math 100.

1. The student will be able to carry out the operations of addition, subtraction, multiplication, and division as applied to whole numbers, common fractions, decimals, and percents.

2. The student will know and use the commutative and associative laws of addition and multiplication.

3. The student will know and apply the distributive law

of multiplication over addition.

4. The student will be able to determine the solution sets of linear equations in one variable.

5. The student will know and be able to apply the laws of integral exponents.

6. By using both algebraic and geometric methods, the student will be able to determine the solution sets of linear equations in two variables.

7. The student will be able to determine the solution sets of fractional equations.

8. The student will be able to perform the operations of multiplication and factoring on polynomials.

9. The student will be able to determine the solution sets of quadratic equations by factoring, completing the square, and the quadratic formula.

10. The student will be able to simplify and add radical expressions.

Prerequisites

There were no stated mathematical prerequisites required for this course. It was designed for those students who failed to qualify for any other math course.

Grading

To receive a final grade in this course, the student had to take a series of tests designed to measure the achievement of the stated performance objectives. Each test was graded and recorded. The final grade was the mean of all the test scores. The grading scale was:

A: 90 - 100 percent

B: 80 - 89 percent

C: 70 - 79 percent

F: No significant progress

N: Satisfactory progress - student may continue the course during the next term.

W: Withdrew from the course.

A student repeats a test until the instructor agrees that the student should move ahead.

Math 101

Performance Objectives

To have achieved the performance objectives of this course, the student had to perform with a degree of accuracy of at least seventy percent.

1. The student will be able to use effectively the terminology of sets and algebraic structure.

2. The student will be able to utilize the fundamental algebraic operations in a real number setting.

3. The student will be able to determine the solution sets of linear equations and linear inequalities in one variable.

4. The student will be able to construct and interpret a Cartesian Coordinate System.

5. The student will be able to graph linear equation and linear inequalities in two variables.

6. The student will be able to perform the basic algebraic operations on the set of polynomials.

7. The student will be able to perform the basic algebraic operations on the set of rational expressions.

8. The student will know and utilize the laws of exponents and radicals.

9. The student will know the formal definitions of relations and functions, and be able to interpret them graphically.

10. The student will be able to solve quadratic equations by means of factoring, completing the square, and the quadratic formula.

11. The student will be able to solve word problems in one variable.

12. The student will be able to solve simultaneous systems; both graphically and algebraically.

Prerequisites

The student should have completed algebra I, plane geometry, and ranked at the fortieth percentile or higher on the Florida Twelfth Grade Placement Test.

Grading

The final grades were based upon four one-hour tests and a comprehensive final test of two hours duration. The four one-hour tests scores determined seventy percent of the student's final grade and the remaining thirty percent was determined by the final test score. The final letter grades were assigned according to the percentage of total possible points achieved.

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the course

Math 106

Performance Objectives

Due to the service function to other mathematics courses, the level of achievement that a student obtained for a given performance objective was a judgement of the instructor. Therefore, the degree of mastery of a given objective is included in the statement of the objective.

1. The student will be able to add, subtract, multiply and divide polynomial expressions of a reasonable level of difficulty with no mistakes in principle.

2. The student will be able to solve linear equations, statement problems for which he derives equations, and solve systems of linear equations with no errors in principles.

3. He will master basic factoring and be familiar with the special products and factors of the forms:

   $(a + b)^2 = a^2 + 2ab + b^2$,

   $(a + b)(a - b) = a^2 - b^2$

   $(a - b)(a^2 + ab + b^2) = a^3 - b^3$, and

   $(a + b)(a^2 - ab + b^2) = a^3 + b^3$.

   The student will be familiar with the general trinomial form $ax^2 + bxy + cy^2$, and expressions of the form $ax^3 - bx^3 + ax - b$. He will be able to solve at least seven out of ten randomly selected problems in this area.

4. The student will be able to add, subtract, multiply and divide algebraic fractions of the form $\frac{ax^2 + bx + c}{cx^2 + ax + e}$.

He will be able to solve seven out of ten problems selected from appropriate sections of the text.

5. The student will be able to solve inequalities of the form: $ax + b \geq o$, $ax + b \leq o$, $ax^2 + bx + c \geq o$, and $ax^2 + bx + c \leq o$, with seventy percent success.

6. The student will be able to solve linear equations, quadratic equations, and linear inequalities in the coordinate plane.

7. He will be able to solve quadratic equations by factoring, completing the square and by the quadratic formula.

8. The student will be able to solve systems of linear equations and systems of quadratic equations.

9. The student will know the laws of exponents and be able to use them in elementary applications.

10. The student will be able to apply the principles ratio and proportion, direct variation, and joint and inverse variation to elementary problems.

11. He will be able to use logarithms as a means of calculating complex products and roots.

Prerequisites

The student who entered Math 106 should have completed Algebra I, plane geometry and ranked at the fiftieth percentile on the Florida Twelfth Grade Placement Test; or he should have completed Math 100.

Grading

Grades in Math 106 were determined by a student's test scores on each of the performance objectives, and the score obtained on a comprehensive examination. Test and examination problems were selected by the instructor, and were comparable in difficulty to the typical homework problems. Final letter grades for the course were assigned according to the percentage of total possible points on the tests. The assignment schedule was as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the course

Math 107

Performance Objectives

In order for a student to have achieved the performance objectives of this course, he had to perform with a degree of accuracy of seventy percent or higher.

1. The student will assimilate the basic notions of set language and operations. He will demonstrate this knowledge in applications to the problem-solving process.

2. The student will study and interrelate the subsets of the real number system. He will demonstrate his understanding by constructing diagrams of the subset relationships.

3. The student demonstrates his understanding of algebraic terminology by defining a given set of terms.

4. The student will learn to solve equations and inequalities of first, second, and higher degrees.

5. The student will be able to define absolute value, solve equations and inequalities involving absolute value and construct the corresponding graphs.

6. The student will learn basic properties of operations, equality and order. He will be able to apply these to a given set of problems.

7. The student will be able to distinguish between relations which are and which are not functions.

8. The student will be able to analyze functions for the following properties: (a) increasing or decreasing, (b) odd or even, and (c) continuous or discontinuous.

9. The student will learn to graph functions of the first, second, and higher degrees.

10. The student will learn to construct and analyze composite functions.

11. The student will be able to construct the inverse of a given function and be able to draw its graph.

12. The student will demonstrate his understanding of the Cartesian Coordinate System by using correct graphing procedures.

13. The student will be able to apply the distance formula, point-slope formula and the slope-intercept formula in the writing of the equations of lines.

14. The student will be able to solve systems of linear equations through the use of row-echelon-reduced matrics, and by Cramer's Rule.

15. The student will learn to analyze and graph polynomial functions using the following aids:
    (a) Descartes' Rule of Signs,
    (b) Rational Root Theorem,

15. (continued)

    (c) symmetry,
    (d) intercepts,
    (e) synthetic division, and
    (f) extrema points.

16. The student will be able to manipulate expressions involving integral and fractional exponents.

17. The student will learn to define, identify and graph logrithmic and exponential functions.

18. The student will learn properties of logarithms and be able to apply these properties to computations.

19. The student will learn to use mathematical induction and to apply this principle to a given set of proofs.

20. The student will learn and use the binomial theorem to find the nth term of a binomial expansion.

21. The student will learn to use the sigma notation as an aid in finding sums and nth terms of geometric series.

Prerequisites

To obtain admission to Math 107, a student should have had plane geometry, Algebra I and Algebra II, or Math 106 and ranked at the seventieth percentile or higher on the

Florida Twelfth Grade Placement Test.

Grading

The student's grade in this class was based on his performance on ten unit-type tests and a comprehensive final examination. The final letter grades were assigned according to the percentage of possible points obtained. The assignments were made as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the class

Math 108

Performance Objectives

In order for a student to have achieved the performance objectives of this course, he had to perform with a degree of accuracy of at least seventy percent.

1. The student will understand the terminology of trigonometry and will demonstrate his understanding by defining a given set of terms.

2. The student will learn to examine a function for periodicity and to identify the fundamental period.

3. The student will learn to use the wrapping function to determine coordinates on the unit circle.

4. The student will learn to identify the sine and cosine functions, and he will be able to calculate the values for sin t and cos t, if given any real number t.

5. The student will learn the basic identities: $\cos^2 t + \sin^2 t = 1$, $\cos(-t) = \cos t$, $\sin(-t) = -\sin t$, and a finite number of other identities which he will apply to a given set of problems.

6. Given a trigonometric function of a real number t the student will be able to find all other trigonometric functions of t.

7. The student will be able to calculate the reference number of a given real number whose image is a point on the unit circle.

8. The student will learn to convert between radian measure and degree measure.

9. The student will be able to graph the six trigonometric functions.

10. The student will be able to determine and graph the inverses of the sine and cosine function.

11. The student will be able to calculate the sine, cosine, and tangent of the special angles: 0°, 30°, 45°, 60°, and 90°.

12. The student will be able to solve trigonometric equations using the related identities and properties.

13. Given a minimum amount of information about the triangle, the student will be able to determine the missing parts by applying the appropriate laws and ratios.

14. The student will be able to apply the laws of sines and cosines.

15. The student will learn to add, subtract, multiply, and divide complex numbers.

16. The student will examine the properties of complex numbers and be able to compare these with the properties of the real number system.

17. The student will be able to convert between rectangular and polar coordinates.

18. The student will learn to determine powers and roots of complex numbers using DeMoives' Theorem.

19. The student will be able to apply the fundamental theorem of Algebra, the factorization theorem, and

the conjugate root theorem to the solution of nth degree equations.

20. The student will be able to formulate an equation whose roots are given.

21. The student will know the geometric and algebraic characteristics of the conic sections and be able to solve a variety of problems involving these concepts.

Prerequisites

Since Math 108 is the second course in a two-course sequence, the only prerequisite required was successful completion of Math 107.

Grading

The student's grade in this class was based on his performance on ten unit-type tests and a comprehensive final examination. The final letter grades were assigned according to the percentage of possible points obtained. The assignments were made as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the class

Math 111

Performance Objectives

In order to have realized the objectives of this course, the student must have performed at the seventieth percent level.

1. The student will be able to use the basic operations in the context of the real numbers.

2. The student will be able to apply the basic properties of geometry to problems in algebra and trigonometry.

3. The student will learn and apply the properties of exponents and radicals.

4. The student will be able to solve linear equations and linear inequalities in one unknown.

5. The student will be able to apply the operations of addition, subtraction, multiplication, and division to the set of polynomials.

6. The student will learn to apply the principles of ratio, proportion and variation in solving word problems.

7. The student will learn to define and graph a function.

8. The student will be able to determine the slope and equation of a straight line.

9. The student will learn the definitions of the trigonometric functions, the values of the trigonometric functions of special angles, and the use of the tables of trigonometric functions including interpolation.

10. The student will be able to solve problems involving right triangles by trigonometry.

11. The student will learn to graph trigonometric functions, determining their amplitude, period, and phase shift.

12. The student will learn, through deriving, the basic trigonometric formulas and identities.

13. The student will learn the use and application of vectors and be able to solve problems involving vector components and sums.

14. The student will learn the four types of oblique triangles and be able to solve for all parts not given.

15. The student will be able to apply the properties of algebra and trigonometry to the solutions of stated problems.

Prerequisites

To enroll in this class the student should have completed algebra I and plane geometry. He should have ranked at the thirtieth percentile or higher on the Florida Twelfth Grade Placement Test.

Grading

A student's final grade in this course was based on the scores he achieved on five one-hour tests and a comprehensive final examination. The final grades were assigned according to the percentage of possible points obtained. The assignments were made as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the course

Math 201

Performance Objectives

To have achieved the stated performance objectives for this course, the student must have performed with seventy percent accuracy.

1. The student will be able to demonstrate a familarity with inequalities, exponents and absolute value. He will know the fundamental axioms, theorems, and definitions of the set of real numbers. He will understand finite mathematical inductions and be able to

use it and other means to prove the theorem relating to the above topics.

2. He will know the exact definitions pertaining to relations and functions and be able to demonstrate a mastery of function notation and graphing. In particular he will master the formation and graphing of linear and quadratic functions.

3. The student will be able to recognize the various types of functions and be able to calculate the inverse of a given function.

4. The student will master the elements of polynomial functions, exponential functions, logarithmic functions, and be able to prove elementary theorems relating to each.

5. The student will master, in considerable detail, the properties of the trigonometric and circular functions. He will be able to derive and use the theorems and formulas of trigonometry. He will be able to solve trigonometric identities and equations.

6. The student will master the solutions of triangles and be able to use trigonometry in solving various kinds of problems.

7. The student will know and be able to apply the fundamental properties of sequences and series.

Prerequisites

To have been admitted to Math 201, the student should have completed algebra I, plane geometry and algebra II. He should have ranked at the eighty-fifth percentile or higher on the Florida Twelfth Grade Placement Test.

Grading

A student's final grade in this course was based on the scores he obtained on seven one-hour tests and a comprehensive final examination. Seventy percent of the final grade was constituted by the seven one-hour tests and the remaining thirty percent by the final examination. The final letter grade was determined by the percentage of possible points achieved.

The assignments were made as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the course

Math 202

Performance Objectives

To have achieved the stated objectives of this course a student must have performed with a minimum accuracy of seventy percent.

1. The student will learn the epsilon-delta definitions of the limit of a real valued function. He will be able to use these definitions to derive and prove the computational limit theorems.

2. The student will be able to use the "limit" concept in formulating and using the concepts of continuity.

3. The student will learn the difference quotient definition of the derivative of a function. He will be able to use this definition in the development and proofs of the differentiation theorems. He will be able to apply the concept of differentiation to the graphing of functions and to "real world" problems.

4. The student will be able to define the differential concept and be able to use it in the development of the differential formulas.

5. The student will be able to determine general and particular solutions to differential equations with variables separable.

6. The student will learn the concept of antidifferentiation and be able to apply this concept to problems in economics and rectilinear motion.

7. The student will learn the sigma notation. He will be able to use this concept to formulate the concepts of area and the definite integral.

8. The student will develop the properties of the definite integral and use these properties in a computational context.

9. The student will be able to prove and apply the mean-value theorem for integrals and the fundamental theorem of the calculus.

Prerequisites

To have been admitted to this course, the student should have completed Math 201, or algebra I, plane geometry, algebra II, trigonometry, and have ranked at the ninetieth percentile or higher on the Florida Twelfth Grade Placement Test.

Grading

A student's final grade in this class was determined by the scores he achieved on six one-hour tests and a comprehensive final examination. The six one-hour tests constituted seventy percent of the final grade and the remaining thirty percent was by the final examination. The final letter grade was based on the percentage of possible points obtained. The letter grade assignments were made as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the course

Math 216

Performance Objectives

To have achieved the performance objectives of this course, the student must have performed with a degree of accuracy of at least seventy percent.

1. The student will develop a knowledge of statistical terminology and be able to demonstrate his understanding by defining a given set of terms.

2. The student will develop the ability to compute the descriptive statistics: mean, median, percentiles, mode, range, variance, and standard deviation.

3. The student will develop an understanding of the

principles and theorems of permutations, combinations and probability. He will demonstrate his understanding by applying these principles to a given set of problems.

4. The student will develop the ability to assess the "likelihood" of a statistical event. Given a set of problems and using his knowledge of probability, the student will be able to construct a mathematical model by which he will calculate the "likelihood" of an event.

5. The student will be able to recognize the relationship between his areas of interest and the area of statistics. He will illustrate this through the selection of three articles in which he will formulate a written summary.

6. The student will develop an awareness of abuses of statistics in everyday life, particularly by the media, and quotations in the media. He will demonstrate this awareness by presenting in written form two examples explaining why they are misuses.

7. The student will be able to understand a simple statistics problem written in the BASIC programming language. This understanding will be demonstrated by interpreting a set of problems written in the BASIC language.

8. The student will learn to recognize statistics as an area of measurable uncertainty. Given a set of problems, he will be able to state and test hypotheses by calculating "alpha" and "beta" values.

9. The student will realize the usefulness of the Z distribution (standard variable) by observing the alternative P (X) formula. He will be able to demonstrate this realization by solving problems with both methods and comparing the accuracy of the results.

10. The student will be able to differentiate between discrete and continuous variables, and between binomial and normal probability distributions.

11. Given a set of problems, the student will be able to: develop hypotheses, formulate a mathematical model, test the hypotheses, and formulate conclusions.

12. The student will be able to determine the error of estimation by finding a point estimate with bounds on the error of estimation, confidence intervals, and given parameters of a random sample drawn from a population.

13. The student will be able to apply the Central Limit Theorem and Tchebycheff's Theorem to a selected set of problems.

14. The student will develop an awareness of the need for small sampling methods and will be able to use the student t - distribution in this context.

Prerequisites

To be admitted to Math 216, the student should have had at least one college mathematics course at the level of Math 101 or higher.

Grading

The student's grade in Math 216 was based on four items:

1) five unit-type objective tests,
2) reading project (1/2 test weight),
3) example search project (1/2 test weight), and
4) comprehensive final examination.

Twenty-five percent of the final grade was determined by the final examination and the remaining seventy-five percent by items one, two, and three. The final letter grades were based on the percentage of possible points obtained. The assignments were made as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the course

Math 251

Performance Objectives

To have achieved the performance objectives in this course the student must have performed with an accuracy of at least seventy percent.

1. The student will be able to calculate the areas of plane regions by using a Riemann sum and the definite integral.

2. The student will be able to determine the volumes of solid of revolution by using the circular disk method, circular ring method, and cylindrical shell method.

3. The student will be able to calculate the volumes of solids having known parallel plane sections.

4. The student will be able to apply the definite integral to the concepts of work, liquid pressure, and center of mass.

5. The student will be able to derive and apply "arc length" formula.

6. The student will be able to develop and apply the differentiation and integration theorems of exponential and logarithmic functions.

7. The student will be able to apply the calculus to the laws of growth and decay.

8. The student will be able to prove and apply the differentiation and integration formulas for the circular functions.

9. The student will be able to prove and apply the differentiation and integration formulas for the hyperbolic functions.

10. The student will be able to prove and apply the differentiation and integration formulas for the inverse circular and hyperbolic functions.

11. The student will make a complete study of the techniques of integration. He will be able to apply the technique of parts, trigonometric substitution, partial fractions, and miscellaneous substitutions.

12. The student will make a complete study of the polar coordinate system. He will be able to construct graphs, determine intersection points, and determine the equations of the tangent lines of polar curves.

13. The student will be able to derive and use the integration formulas for calculating areas in polar coordinates.

14. The student will prove the Cauchy Mean-Value Theorem and use the result to prove L'Hopital's Rule. The student will be able to apply this rule to the solutions or problems involving the standard indeterminate forms.

15. The student will be able to apply the techniques of indeterminate forms to the solutions of improper integrals.

16. The student will be able to approximate definite integrals by using the trapezoidal rule and Simpson's Rule.

17. The student will prove Taylor's Formula. He will be able to use this formula in the approximation of given functions.

Prerequisites

The students enrolled in Math 251 were required to have completed Math 202.

Grading

The final grade received by a Math 251 student was based upon his performance on seven one-hour tests and a comprehensive final examination. Seventy-five percent of the grade was determined by the one-hour tests and the remaining twenty-five percent by the final examination. The letter grades were assigned according to the percentage of possible points obtained. The assignments were made as follows:

A: 90 - 100 percent

B: 80 - 89 percent

C: 70 - 79 percent

D: 60 - 69 percent

F: 0 - 59 percent

W: Withdrew from the course

Math 252

Performance Objectives

The student who achieved the stated performance objectives of Math 252 had to perform with at least seventy percent accuracy.

1. The student will be able to write the definition of a sequence of real numbers, and he will be able to apply this definition in the discussion of bounded and monatonic sequences.

2. The student will be able to discuss the convergence and divergence of infinite series and positive and constant terms.

3. The student will be able to determine convergence and divergence of infinite series by applying the comparison test, ratio test and the integral test.

4. The student will be able to differentiate and integrate power series.

5. The student will be able to construct and apply the Taylor series and the binomial series.

6. The student will understand and be able to apply the concept of a vector space in both two and three dimensions.

7. The student will know and be able to apply the calculus of vector-valued functions. He will be able to calculate plane motion, arc length, unit tangent vector, unit normal vector, curvature, and the tangential and normal components of acceleration.

8. The student will be able to write the vector equations of curves, planes and lines in three-space.

9. The student will be able to calculate the cross product of two vectors in three space. He will also be able to calculate the areas of quadric surfaces, and cylinders and surfaces of revolution.

10. The student will be able to write equations of surfaces in cylindrical and spherical coordinates.

11. The student will be able to define and calculate the limits of functions with more than one variable.

12. The student will be able to define and discuss the continuity

of functions with more than one variable.

13. The student will know and be able to use the concepts of partial derivatives, differentiability and the total differential.

14. The student will be able to prove and apply the chain rule for partial derivatives. He will also be able to calculate directional derivatives and the gradient.

15. The student will be able to determine tangent planes and normals to surfaces. He will also be able to solve equations involving higher order partial derivatives.

16. The student will know and be able to understand the concepts of the extrema of functions of two variables. He will be able to apply partial differentiation to areas in economics.

17. The student will know and be able to use the concepts of double and triple integrals. He will be able to use these multiple integrals in the calculation of centers of mass, moments of inertia, and surface areas. He will also be able to use multiple integrals in polar, cylindrical, and spherical coordinates.

Prerequisites

The student enrolled in this class should have completed Math 251.

Grading

The student's final grade in Math 252 was based on seven one-hour tests and a comprehensive final examination. The hourly tests accounted for seventy percent of the final grade and the final examination accounted for the remaining thirty percent. The final letter grades were based on the percentage of possible points obtained. The letter grade assignments were made as follows:

A: 90 - 100 percent
B: 80 - 89 percent
C: 70 - 79 percent
D: 60 - 69 percent
F: 0 - 59 percent
W: Withdrew from the course

Summary

In this chapter the academic environment of the sample used in this study was presented. It contained students who were enrolled in courses ranging from remedial (Math 100) to the third course in calculus (Math 252). The stated performance objectives for the given courses indicate that a borad spectrum of achievement levels was present in the sample. These levels ranged from simple response in the remedial courses to characterization in the calculus courses.

A student was placed in a given course according to his minimum mathematical background. The measured components of a student's background were previously completed mathematics courses and his percentile ranking on the mathematics section of the Florida Twelfth Grade Placement Test.

The final grade that a student received in a given course was based upon his degree of mastery of the stated performance objectives for the course. Therefore, the grade assignments were always criterion referenced and in the context of behavioral activities.

CHAPTER IV

RESULTS

Introduction

The findings reported in this chapter are based on the statistical analyses of the scale measurements taken on the "Learning Styles Inventory" and the "Teaching Styles Inventory." The numerical measurements of the "Learning Styles Inventory" appear in Appendix VIII and those of the "Teaching Styles Inventory" appear in Appendix X. Appendices IX and XI contain the statistical analyses of the scores appearing in Appendices VIII and X respectively. Appendix XIII is a tabulation of the significant "t" and "F" statistics. The narrative that follows is the essence of these statistics.

The narration consists of a two-part format. (1) the results of comparing the "Learning Styles Inventories" of students with varying levels of grade achievement, and (2) the results of comparing "Learning Styles" with "Teaching Styles." In part one the seventeen scales on the "Learning Styles Inventory" are examined on a scale by scale basis. In part two the discussion consists of comparing the distribution of the "Learning Styles Inventory" scores with the distributions of the "Teaching Styles Inventory" scores.

Discussions in part one of each of the scales is in the context of the tested hypotheses, that is, to what extent for a given scale was a significant difference (at the .05 level) observed between comparison groups. The bases for this commentary are the "t" and "F" statistics contained in Appendix IX.

In part one each of the seventeen scales on the "Learning Styles Inventory" is examined in the context of three distinct groupings of the sample: (1) the sample partitioned according to the final grade achieved, (2) the sample partitioned according to instructor, and (3) the sample partitioned according to course. The latter grouping is further partitioned into five sub-groupings which are defined below.

Sub-group I.	Remedial mathematics: all students enrolled in Math 100 courses.
Sub-group II.	Intermediate mathematics: all students enrolled in Math 101, Math 106, and Math 111 courses.
Sub-group III.	Pre-Calculus mathematics: all students enrolled in Math 107, Math 108 and Math 201 courses.
Sub-group IV.	Calculus: all students enrolled in Math 202, Math 251, and Math 252.
Sub-group V.	Statistics: all students enrolled in Math 216 courses.

In part two the stated results are based upon the "Goodness of Fit Test" calculations that appear in Appendix XI. The presentation of the results begins with a comparison of the "Teaching Styles" distribution (Appendix XI) of instructor one with the distributions of the "Learning Styles" of his students with varying grade levels; and terminates with similar comparisons for instructor six. Significance is measured at the .05 level using the Chi-Square distribution.

The "Learning Styles Inventory" was administered to five hundred and seventy-five students. Four of the inventories were rejected because the students failed to submit proper identification information. The "Teaching Styles Inventory" was completed by six instructors who have been identified by the consecutive integral values one through six.

Part I: Comparisons of the Learning Styles Inventories

Introduction

The following are the general forms of the hypotheses that are tested in Part I.

Type A. There is no significant difference (at the .05 level) in the mean score, U_x, of group x and the mean score, U_y, of group y.

Null Hypothesis, AH_0: $U_x = U_y$

Alternative Hypothesis, AH_1: $U_x \neq U_y$

Type B. There is no significant difference (at the .05 level) in the variance, S_x^2, of group x and the variance, S_y^2, of group y.

Null Hypothesis, BH_0: $S_x^2 = S_y^2$

Alternative Hypothesis, BH_1: $S_x^2 \neq S_y^2$

The symbols x and y are used to designate elements of the set of grades: A, B, C, D, F and W, where x and y do not assume the same values simultaneously.

All paired combinations of these six grade groups were formed; that is, each grade level was compared with every other grade level. This pairing procedure produced a total of fifteen comparison pairs. Each of these comparison pairs was examined in terms of the mean and variance scores achieved by each pair component on each scale of the "Learning Styles Inventory." This procedure produced a total of two hundred and fifty-five mean score comparison pairs, and a like number of variance score comparison pairs.

For each of the comparison pairs a t-statistic was calculated and used to test the Null Hypothesis AH_0. An F-statistic was calculated for each comparison pair and used to test the Null Hypothesis BH_0. The following table displays the comparison pairs and the corresponding test statistic calculated. "t" denotes that a t-statistic was calculated for the indicated pair and "F" denotes the calculation of an F-statistic for the indicated pair. The actual values of the "t" and "F" statistics appear in Appendix IX.

TABLE III

DISPLAY OF COMPARISON PAIRS AND THEIR CORRESPONDING TEST STATISTICS

(Mean Score Comparisons)						(Variance Score Comparisons)					
	B	C	D	F	W		B	C	D	F	W
A	t	t	t	t	t	A	F	F	F	F	F
B		t	t	t	t	B		F	F	F	F
C			t	t	t	C			F	F	F
D				t	t	D				F	F
F					t	F					F

In analyzing the significant differences in mean scores that occurred for each comparison group, two basic patterns were sought: (1) a uniform distribution whenever a lower grade was held fixed and compared with higher grades, and (2) a consecutive sequence whenever a higher grade was held fixed and compared with lower grades. Since the "Learning Styles Inventory" measures a student's relative preference for given styles in a strict numerical rank (Appendix IV), and since grade levels were determined by a strict numerical ranking in the achievement of performance objectives (Chapter III), then these patterns in significant differences of mean scores must consistently exist throughout the comparison groups in order for the "Learning Styles Inventory" to identify students of a given grade level by measuring their "learning styles." There are ten possible uniform distributions across the comparison pairs, grade x/grade y:

1. A/B, B/C
2. A/D, B/D
3. A/D, B/D, C/D
4. A/F, B/F
5. A/F, B/F, C/F
6. A/F, B/F, C/F, D/F
7. A/W, B/W
8. A/W, B/W, C/W
9. A/W, B/W, C/W, D/W
10. A/W, B/W, C/W, F/W

There are twenty-five possible consecutive sequences across the comparison pairs, grade x/grade y:

1. A/B through F/W
2. A/B through D/W
3. A/B through C/W
4. A/B through B/W
5. A/B through A/W
6. A/C through B/W
7. A/C through A/W
8. A/D through A/W
9. A/F through A/W

1. Omit grade W
2. Omit grade W
3. Omit grade W
4. Omit grade W
5. Omit grade W
6. Omit grade W
7. Omit grade W
8. Omit grade W

1. Omit F and D
2. Omit F and D
3. Omit F and D
4. Omit F and D
5. Omit F and D
6. Omit F and D
7. Omit F and D
8. Omit F and D

Significant differences in variance scores were analyzed primarily in terms of their frequency.

Comparison Group I: The Sample Partitioned According to Final Grade Achieved

This group contained five hundred and seventy-one students. The grades distributed among these students were as follows:

Grade A: eighty-six,

Grade B: one hundred and four,

Grade C: one hundred and ninety-three

Grade D: forty-one,

Grade F: nineteen, and

Grade W: one hundred and twenty-eight.

In comparison Group I the Null Hypothesis, AH_0 was rejected in seventy-two instances and the Null Hypothesis, BH_0 was rejected in twenty-seven instances. This yields a rejection rate for the Null Hypotheses AH_0 and BH_0 of twenty-eight percent and eleven percent respectively. Table IV shows the comparison pair and scale for which the hypothesis was rejected.

TABLE IV

TABLE OF NULL HYPOTHESES FOR COMPARISON GROUP I REJECTED ON THE BASIS OF "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

SCALE	COMPARISON PAIRS: A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP			BH_0		AH_0	AH_0						AH_0	BH_0		
CSO		AH_0	AH_0 BH_0		AH_0		AH_0		AH_0				AH_0		
CAG		BH_0	AH_0		AH_0	BH_0			AH_0			AH_0			
CEC				AH_0				AH_0		BH_0	AH_0		AH_0	BH_0	
CAT		AH_0	AH_0		BH_0		AH_0 BH_0		BH_0	AH_0 BH_0			AH_0	AH_0 BH_0	
CSD						AH_0	AH_0				AH_0		AH_0		
CAI		BH_0	BH_0		AH_0				AH_0					AH_0	
CEA		AH_0	AH_0	AH_0	AH_0		BH_0	BH_0		BH_0				BH_0	
CN		AH_0	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0						
CQ		AH_0													
CI		AH_0								AH_0					
CP	BH_0	AH_0		AH_0	AH_0	AH_0		AH_0	AH_0				AH_0		AH_0
ML															
MR			AH_0				AH_0 BH_0								
MI		AH_0	AH_0 BH_0	BH_0		AH_0	AH_0	BH_0		BH_0	BH_0	AH_0	AH_0	AH_0 BH_0	BH_0
MD													AH_0		
E	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0						

With the exception of scale ML, significant differences in mean scores between comparison pairs occurred on every scale for this group. Scales E, CP, CN, MI, CAT, and CSO had frequency occurrences of these significant differences of nine, eight, eight, six, and six respectively. The next greatest instances of significant differences was a frequency of four which resulted for scales CAG, CSD, CEC, and CEA. Three instances of significant differences in mean scores were obtained for scales CAP and CAI. Scales CI and MR had two instances each of significant differences and there was one occurrence for scales CQ and MD.

Scale CEC showed a uniform distribution of significant differences in mean scores across the pairs A/F, B/F, C/F, and D/F. A uniform distribution across the pairs A/D, B/D, and C/D was obtained for scale CAT; and a uniform distribution across A/W, B/W, and C/W was observed for scale CAG. Scales CN and MI each had uniform distributions over the pairs A/C and B/C. The scales having distributions across A/D and B/D were: CSO, CN, MR, MI, and E. Uniform distributions across the pairs A/F and B/F were CN, CP, and E. Scales CSO, CAT, CN, CP, and E each had uniform distributions of significant differences in mean scores across the comparison pairs A/W and B/W.

There were three scales that had consecutive sequences of significant differences in mean scores through the comparison pairs. A consecutive sequence of A/B through B/W was obtained for scale E. Consecutive sequences of A/C through B/W, and

A/C through A/W were observed for scales CN and CEA respectively.

A significant difference in variance scores was obtained on ten of the seventeen scales. These differences occurred on every conditions scale except for scale CSD; however, they occurred on only one content scale, CP, and on two mode scales, MR and MI. No measureable differences in variance scores were obtained for scale E.

Seven instances of significant differences in variance scores were obtained on scale MI. Although these differences do not form a consecutive sequence through the comparison pairs, there is a degree of uniformity in the distribution across the comparison pairs in the sense that differences occurred for the pairs A/F, B/F, and C/F. The remaining nine scales that showed significant differences all had random distributions across the comparison pairs. Scales CAT and CEA had occurrences of five and four respectively and the remainder had less than three occurrences.

Comparison Group II: The Sample Partitioned According to Instructor

In this comparison group the sample was partitioned into sub-groups corresponding to the instructor teaching the course in which the student was enrolled at the time his "Learning Styles Inventory" measurements were taken. This procedure generated six distinct sub-groups, one sub-group for each instructor participating in the study. Each of these sub-groups were subjected to the same statistical analyses

(Appendix IX) that were applied to comparison group I. The results of the analyses are presented on a sub-group by sub-group basis that begins with instructor one and continues consecutively until termination with instructor six.

Instructor One

This sub-group contained one hundred and thirteen students. The grade distribution of these students was as follows:

Grade A: twelve,
Grade B: fifteen,
Grade C: twenty-four
Grade D: ten,
Grade F: eight, and
Grade W: forty-four.

In this sub-group the Null Hypothesis, AH_0, was rejected in fifty-six instances and the Null Hypothesis, BH_0, was rejected in twenty-four instances. This constitutes a rejection rate for the Null Hypotheses, AH_0 and BH_0, of twenty-two percent and nine percent respectively. Table V shows the comparison pair and scale for which the hypothesis was rejected.

TABLE V

TABLE OF NULL HYPOTHESES FOR INSTRUCTOR ONE SUB-GROUP REJECTED ON THE BASIS OF "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

	COMPARISON PAIRS:														
SCALE	A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP		BH_0									BH_0	AH_0		AH_0	BH_0
CSO															
CAG					AH_0				AH_0			AH_0			
CEC						AH_0			AH_0						
CAT		AH_0	AH_0 BH_0			AH_0	AH_0	AH_0						AH_0 BH_0	
CSD															
CAI						AH_0			AH_0						
CEA		AH_0			AH_0	AH_0	AH_0		AH_0						
CN					AH_0 BH_0	BH_0		BH_0	AH_0 BH_0						
CQ									AH_0						AH_0
CI		AH_0										BH_0			
CP				AH_0				AH_0	AH_0		AH_0		BH_0		BH_0
ML					BH_0		AH_0			AH_0		AH_0			
MR			AH_0				AH_0		AH_0	AH_0		AH_0			
MI			AH_0 BH_0	AH_0 BH_0			AH_0	AH_0 BH_0	AH_0	AH_0	AH_0 BH_0		BH_0	BH_0	BH_0
MD		AH_0							AH_0			AH_0			
E		AH_0	AH_0	AH_0	AH_0 BH_0	AH_0	AH_0	AH_0 BH_0	AH_0 BH_0			AH_0 BH_0			

As shown by Table V, significant differences in mean scores occurred on every scale of the "Learning Styles Inventory," except for scales CSO and CSD. These significant differences occurred most frequently on scale E. Scales MI and CAT showed a frequency of seven and six respectively; scales MR and CEA each had five occurrences; scale CP showed significant differences in four instances; three instances were recorded for each of the scales CAG, ML, and MD; two occurrences were observed for each of the scales CAP, CEC, CAI, CN, and CQ; and there was one occurrence for scale CI.

Uniform distributions in significant differences of mean scores across the comparison pairs A/F, B/F, and C/F existed for scales CP and MI; and scales MR and MI had uniform distributions across A/D, B/D, and C/D. A uniform distribution across the pairs A/W, B/W, and C/W was obtained for each of the scales CAG and E. Scales CAT, CEA, and E each had uniform distributions of significant differences in mean scores on the comparison pairs A/C and B/C. Uniform distributions on the pairs A/D and B/D were obtained for scales CAT and E. Scales CEA and CN each showed uniform distributions for A/W and B/W.

The only consecutive sequence of significant differences in mean scores was for scale E. This occurred for the comparison pairs A/C through B/W.

A significant difference in variance scores was obtained on eight of the seventeen scales. These differences occurred on two conditions scales: CAP and CAT; three content scales:

CN, CI, and CP, and two mode scales: ML and MI.

The greatest frequency of significant differences of variance scores occurred on scale MI. Four of the seven occurrences on scale MI were for the comparison pairs A/F, B/F, C/F, and D/F which indicates a degree of uniformity in the distribution. Significant differences were also observed for comparison pairs D/W and F/W, but not for C/W, B/W, and A/W. Four instances of significant differences in variance scores occurred for scales E and CN; three instances were recorded for scale CAP; two instances each for scales CAT and CP; and one occurrence for each of the scales CI and ML. With the exception of MI, no uniform distribution in significant differences of variance scores was indicated.

Instructor Two

This sub-group contained a total of one hundred and forty-three students. The grade distribution of these students was as follows:

Grade A: twenty-five,
Grade B: twenty-three,
Grade C: forty,
Grade D: nine,
Grade F: three, and
Gradw W: forty-three.

For this sub-group the Null Hypothesis, AH_0, was rejected a total of forty times and the Null Hypothesis, BH_0, was rejected a total of twenty-nine times. This constitutes a rejection for the Null Hypotheses, AH_0 and BH_0, of sixteen percent and eleven percent respectively. Table VI shows the comparison pair and scale for the hypothesis rejected.

TABLE VI

TABLE OF NULL HYPOTHESES FOR INSTRUCTOR TWO SUB-GROUP REJECTED ON THE BASIS OF "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

SCALE	COMPARISON PAIRS: A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP			BH_0			AH_0	BH_0			AH_0 BH_0		AH_0	AH_0	BH_0	
CSO	BH_0	AH_0	AH_0		AH_0		AH_0		AH_0		AH_0		AH_0		AH_0
CAG		BH_0	AH_0	BH_0	AH_0	BH_0		BH_0	AH_0	AH_0	BH_0	AH_0	BH_0		
CEC			BH_0	BH_0			AH_0 BH_0	BH_0		AH_0 BH_0	BH_0		BH_0	AH_0 BH_0	
CAT			AH_0				AH_0			AH_0				AH_0 BH_0	
CSD					AH_0	BH_0						AH_0			
CAI					AH_0					BH_0					AH_0
CEA		AH_0	AH_0 BH_0			BH_0	BH_0					AH_0			
CN		AH_0			AH_0	AH_0			AH_0						
CQ															
CI			BH_0				BH_0							BH_0	
CP			BH_0												
ML															
MR															
MI															
MD															
E		AH_0			AH_0	AH_0			AH_0					AH_0	

As indicated by Table VI, significant differences in mean scores occurred on ten of the seventeen scales of the "Learning Styles Inventory." Most of these differences occurred on the conditions section of the "Learning Styles Inventory." Only one content scale, CN, showed a significant difference and no mode scales showed measureable differences between comparison pairs.

The most frequent occurrences of significant differences appeared on scale CSO, which had a total of eight. The frequency of occurrence for scale CAG and E was five; and each of the scales: CAP, CAT, and CN had a frequency of four. There were three instances of significant differences in mean scores for scales CEC and CEA; and scales CSD and CAI each had two occurrences.

Uniform distributions in significant differences in mean scores existed for scale CAT on the pairs A/D, B/D, and C/D, and for scale CAG in the pairs A/W, B/W, and C/W. Scales CN and E each had uniform distributions across the pairs A/C and B/C, and along with CSO, across the pairs A/W and B/W. Scale CSO also showed a uniform distribution of significant differences in mean scores for the comparison pairs A/D and B/D. No consecutive sequences in significant differences in mean scores existed for this comparison group.

Table VI shows that significant differences in variance scores also occurred on ten of the seventeen scales of the "Learning Styles Inventory." These differences appeared on all of the condition scales and on two content scales, CI and CP.

The most numerous occurrences, eight, in significant differences in variance scores were on scale CEC. Scales CAG and CAP had frequencies of six and four respectively. Three instances each were recorded for scales CEA and CI; and one instance of significant differences was observed for each of the scales: CSO, CAT, CSD, CAI, and CP.

No consecutive sequences of significant differences in variance scores appeared through a fixed grade level on any scale. However, a uniform distribution did occur on scale CEC when the grade levels A, B, and C were compared to D and F. A similar distribution was obtained for scale CAG when the grade levels A, B, C, and D were compared to F. No uniform distribution was indicated for the remaining scales.

Instructor Three

This sub-group contained a total of thirty-nine students. Since this instructor conducted his courses in a laboratory setting with an individualized format that utilized time-variable and mastery learning, there were no D and F grades in the grade distribution for the sub-group. The grade distribution for the students in this sub-group was as follows:

Grade A: nine,
Grade B: three,
Grade C: twenty-three,
Grade D: zero,

Grade F: zero, and

Grade W: four.

In this sub-group the Null Hypothesis, AH_0, was rejected in eight instances and the Null Hypothesis, BH_0, was rejected in six instances. This yields a rejection rate for the Null Hypotheses, AH_0 and BH_0, of four percent and three percent respectively. Table VII shows the comparison pair and scale for which the hypothesis was rejected.

TABLE VII

TABLE OF NULL HYPOTHESES FOR INSTRUCTOR THREE SUB-GROUP REJECTED ON THE BASIS OF "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

	COMPARISON PAIRS:														
SCALE	A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP												AH_0			
CSO															
CAG															
CEC	BH_0					BH_0			BH_0						
CAT															
CSD															
CAI															
CEA															
CN					AH_0							AH_0			
CQ												BH_0			
CI	AH_0 BH_0	AH_0				AH_0			AH_0						
CP															
ML															
MR						BH_0									
MI		AH_0													
MD															
E															

As shown by Table VII, significant differences in mean scores occurred on four scales. These differences appeared on one condition scale, two content scales, and one mode scale.

Scale CI had the greatest frequency of occurrence of significant differences with a total of four. Two instances of significant differences were recorded for scale CN and one instance each for scales CAP and MI.

Significant differences in mean scores were obtained on scale CI for the consecutive pairs A/B and A/C. The other scales showed no consecutive sequences.

One condition scale, two content scales and one mode scale showed significant differences in variance scores. The frequencies of these occurrences were: scale CEC, three, and one each for scales CQ, CI, and MR. No consecutive sequences in measureable differences of variance scores were obtained.

Instructor Four

This sub-group contained a total of one hundred and four students. The grade distribution of these students was as follows:

Grade A: seventeen,
Grade B: seventeen,
Grade C: fifty-three,
Grade D: three,
Grade F: four, and
Grade W: ten.

In this sub-group the Null Hypothesis, AH_0, was rejected a total of twenty-nine times and the Null Hypothesis, BH_0, was rejected a total of twenty-eight times. This yields a rejection rate for the Null Hypotheses, AH_0 and BH_0, of eleven percent each. Table VIII shows the comparison pair and scale for the hypotheses rejected.

TABLE VIII

TABLE OF NULL HYPOTHESES FOR INSTRUCTOR FOUR SUB-GROUP REJECTED ON THE BASIS OF "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

SCALE	COMPARISON PAIR A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP						BH_0									
CSO															
CAG		BH_0			BH_0				BH_0		AH_0	AH_0			
CEC															
CAT				AH_0				AH_0			AH_0		AH_0		AH_0
CSD											BH_0				
CAI	BH_0	BH_0						AH_0			AH_0		AH_0		AH_0
CEA						AH_0									
CN		AH_0	AH_0	AH_0											
CQ		AH_0	AH_0		AH_0						AH_0		AH_0		AH_0
CI			BH_0	BH_0		BH_0	BH_0	BH_0			AH_0 BH_0		AH_0		BH_0
CP			AH_0 BH_0	AH_0			BH_0	AH_0		BH_0			BH_0	BH_0	AH_0
ML				BH_0				BH_0			BH_0			BH_0	BH_0
MR														BH_0	
MI															
MD						BH_0									
E	BH_0			AH_0		BH_0		AH_0							

Significant differences in mean scores for this sub-group occurred on four conditions scales, all content scales, no mode scales, and on the expectancy scale.

The frequency of occurrence on each of the conditions scales: CAT, CAI, CAG, and CEA was five, four, two, and one respectively. Scale E had two instances of significant differences in mean scores.

A uniform distribution of significant differences in mean scores across the pairs A/F, B/F, C/F, and D/F was obtained for scale CAT. Scales CP and E each had uniform distributions across the comparison pairs A/F and B/F. No consecutive sequences of significant differences in mean scores were discovered for this comparison group.

Significant differences in variance scores for this sub-group occurred on four conditions scales, two content scales, two mode scales and the expectancy scale.

The frequency of occurrence on each of the conditions scales: CAG, CAI, CSD, and CAP was three, two, one, and one respectively. The content scales CI and CP had frequencies of seven and five respectively. A significant difference in variance scores was observed in one instance each for the scales MR and MD. There were two occurrences for scale E.

Scales CI and ML had uniform distribution of significant differences in variance scores through the comparison pairs A/F, B/F, and C/F. The remaining scales showed no uniform distributions, except for CI where differences occurred for the pairs A/D and B/D.

Instructor Five

This sub-group contained a total of ninety-three students. The grade distribution was as follows:

Grade A: nine,

Grade B: twenty-six,

Grade C: twenty-nine,

Grade D: eleven,

Grade F: two, and

Grade W: sixteen.

In this sub-group the Null Hypothesis, AH_0, was rejected a total of forty times and the Null Hypothesis, BH_0, was rejected a total of twenty-five times. This yields a rejection rate of the Null Hypotheses, AH_0 and BH_0, of sixteen percent and ten percent respectively. Table IX shows the comparison pairs and scale for the rejected hypotheses.

TABLE IX

TABLE OF NULL HYPOTHESES FOR INSTRUCTOR FIVE SUB-GROUP REJECTED ON THE BASIS OF "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

	COMPARISON PAIR														
SCALE	A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP															
CSO	AH_0	BH_0	AH_0		AH_0 BH_0	BH_0	AH_0		AH_0 BH_0	AH_0		AH_0			
CAG			AH_0	BH_0	AH_0			AH_0							
CEC													AH_0		
CAT			AH_0						BH_0						
CSD							BH_0								
CAI															
CEA			BH_0	AH_0			BH_0			BH_0	AH_0		AH_0	BH_0	
CN				AH_0	BH_0	AH_0	AH_0	AH_0			AH_0	AH_0	AH_0	AH_0	AH_0
CQ			BH_0				BH_0			BH_0				AH_0 BH_0	
CI						BH_0									
CP						AH_0						AH_0	AH_0		
ML			BH_0	AH_0			BH_0	AH_0		BH_0	AH_0				
MR															
MI		BH_0				AH_0	AH_0					AH_0		AH_0	
MD				BH_0				BH_0			BH_0		BH_0	AH_0	
E	AH_0 BH_0	AH_0	AH_0		AH_0										

As indicated by Table IX, significant differences in mean scores occurred on five conditions scales, three content scales, three mode scales, and the expectancy scale.

The condition scale CSO showed seven occurrences of significant differences in mean scores; scales CAG and CEA each had three occurrences; and scales CEC and CAT each had one occurrence. There were nine instances of significant differences on the content scale CN, three instances on CP, and one occurrence on CQ. On the mode scales, MI had four occurrences of significant differences, ML three instances, and MD one occurrence. Four occurrences in significant differences were obtained for scale E.

On scale CN there were two consecutive sequences of significant differences. These occurred for the comparison pairs B/C, B/D, and B/F and for the pairs C/F through F/W. Also a uniform distribution existed for the pairs A/F, B/F, C/F, and D/F. Consecutive significant differences in mean scores occurred on scale E for the pairs A/B, A/C, and A/D. Scale ML showed a uniform distribution for the comparison pairs A/F, B/F, and C/F. Two uniform distributions occurred on scale CSO; the comparison pairs were A/D, B/D, and C/D and C/W, B/W, and A/W. The remaining scales showed no uniform distribution or consecutive sequences.

Table IX shows significant differences in variance scores occurred on every scale except CAP, CEC, CAI, CP, and MR. Scales CSO, CEA, CQ, and MD each had four occurrences; scale ML had three occurrences; and the remainder had one occurrence each. Uniform distributions over pairs A/D, B/D, and C/D were observed for scales CEA, CQ, and ML. The remaining scales had random distributions.

Instructor Six

This sub-group contained a total of seventy-nine students. The grade distribution was as follows:

Grade A: fourteen,
Grade B: twenty,
Grade C: twenty-four,
Grade D: eight,
Grade F: two, and
Grade W: eleven.

For instructor six the Null Hypothesis, AH_0, was rejected in forty-one instances and the Null Hypothesis, BH_0, was rejected in eleven instances. This yields a rejection rate of AH_0 and BH_0 of sixteen percent and four percent respectively. Table X shows the differences for each scale and the corresponding comparison pairs.

TABLE X

TABLE OF NULL HYPOTHESES FOR INSTRUCTOR SIX SUB-GROUP REJECTED ON THE BASIS OF "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

	COMPARISON PAIRS														
SCALE	A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP	AH_0				AH_0							AH_0		AH_0	AH_0
CSO		BH_0	BH_0		AH_0										
CAG					AH_0							AH_0			
CEC	AH_0						AH_0								
CAT									BH_0			AH_0			
CSD	BH_0	BH_0			BH_0	AH_0 BH_0		BH_0	AH_0						
CAI												BH_0	BH_0		
CEA															
CN	AH_0	AH_0	AH_0		AH_0	AH_0									
CQ							AH_0			AH_0		AH_0			
CI			AH_0				AH_0			AH_0			AH_0		
CP	BH_0	AH_0	AH_0		AH_0	AH_0									
ML															
MR	AH_0														
MI			AH_0										AH_0		
MD									AH_0						
E	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0	AH_0							

As shown by Table X, significant differences in mean scores occurred on six conditions scales, all content scales, three mode scales, and the expectancy scale.

There were eight occurrences on scale E, and five occurrences on each of the scales CAP and CN. The content scales CI and CP each had three instances of significant differences in mean scores. Scale CQ showed a frequency of three and scales CAG, CEC, CSD, and MI each had a frequency of two. One occurrence of significant differences in mean scores was observed for each of the scales CSO, CAT, MR, and MD.

A consecutive sequence of significant differences in means was observed for scale E for the comparison pairs A/B through B/F. Scale CN showed a consecutive sequence through the pairs A/B, A/C, and A/D. Scale CP had a uniform distribution on pairs A/C and B/C. A uniform distribution resulted for scale CI on the pairs A/D, B/D, and C/D.

Significant differences in variance scores were recorded for five scales: CSO, CAT, CSD, CAI, and CP. Most of these occurrences were on the conditions scales; CSO had five occurrences and there were two occurrences each for scales CSD and CSO.

Comparison Group III: The Sample Partitioned According to Course

In this comparison group the sample was partitioned into five sub-groups as defined in the introductory section of this chapter. These sub-groups were defined as follows:

Sub-group I: Remedial Mathematics
Sub-group II: Intermediate Mathematics
Sub-group III: Pre-Calculus Mathematics
Sub-group IV: Calculus
Sub-group V: Statistics

This comparison group was subjected to the same statistical analyses (Appendix IX) applied to comparison groups I and II. The results of these analyses is on a sub-group by sub-group basis that begins with Sub-group I and continues consecutively until termination with Sub-group IV.

Sub-group I

This comparison sub-group contained a total of eighty-six students. The courses in this group were conducted in a laboratory setting with an individualized format that utilized time-variable and mastery learning. The grade distribution for these students was as follows:

Grade A: twelve,
Grade B: five,
Grade C: sixty-four,
Grade D: zero,
Grade F: zero, and
Grade W: five.

This sub-group had twenty-six instances of rejection for the Null Hypothesis, AH_0, and nine instances of rejection for the Null Hypothesis, BH_0. This constitutes a rejection rate of thirty-one percent and eleven percent respectively for AH_0 and BH_0. Table XI shows these instances of rejection.

TABLE XI

TABLE OF NULL HYPOTHESES FOR SUB-GROUP I REJECTED ON THE BASIS OF THE "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

	COMPARISON PAIRS														
SCALE	A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP					BH_0	AH_0						AH_0 BH_0			
CSO	BH_0	AH_0 BH_0													
CAG	AH_0				AH_0	AH_0						AH_0			
CEC															
CAT						BH_0			BH_0						
CSD						AH_0			AH_0						
CAI	AH_0	AH_0			AH_0	AH_0									
CEA	AH_0					AH_0									
CN		AH_0			AH_0										
CQ		BH_0										AH_0			
CI					BH_0							BH_0			
CP					AH_0										
ML															
MR															
MI												AH_0			
MD		AH_0							AH_0			AH_0			
E	AH_0	AH_0			AH_0										

Table XI shows significant differences in mean scores occurred on: all conditions scales except CEC and CAT, all content scales except CI, the mode scales MI and MD, and the expectancy scale.

Significant differences in mean scores occurred in four instances for each of the scales CAG and CAI. Scales MI and MD each had three occurrences; scales CAP, CSD, CEA, and CN each had two occurrences; and the remaining scales had one occurrence each.

There were two scales, CAI and E, showing uniform distributions of significant differences in mean scores across the pairs A/C and B/C. Scales E and CAI each showed a consecutive sequence in significant differences of mean scores through the pairs A/B, A/C, and A/W. A consecutive sequence for scale CN was observed on the pairs A/C and A/W.

Significant differences in variance scores appeared on only five scales: CAP, CSO, CAT, CQ, and CI. These scores were randomly distributed.

Sub-group II

This comparison sub-group contained a total of two hundred and nineteen students. The grade distribution for these students was as follows:

Grade A: thirty-two,
Grade B: thirty-seven,
Grade C: eighty,
Grade D: seventeen,

Grade F: thirteen, and

Grade W: forty.

For this sub-group, the Null Hypothesis, AH_0, was rejected a total of forty-four times and the Null Hypothesis, BH_0, had sixteen rejections. The rate of rejection for AH_0 and BH_0 was seventeen percent and six percent respectively. Table XII shows the scale and comparison pair for which the rejections occurred.

TABLE XII

TABLE OF NULL HYPOTHESES FOR SUB-GROUP II REJECTED ON THE BASIS OF THE "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

SCALE	COMPARISON PAIRS A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP									AH_0			AH_0			AH_0
CSO			AH_0				AH_0			AH_0			AH_0	AH_0	
CAG					BH_0				AH_0			AH_0			
CEC				AH_0			AH_0				AH_0		AH_0		AH_0
CAT		AH_0	AH_0				AH_0			AH_0			AH_0	AH_0	
CSD											AH_0				
CAI		BH_0	AH_0 BH_0				AH_0			AH_0				AH_0	
CEA															
CN	AH_0	AH_0	AH_0	AH_0	AH_0										
CQ			AH_0							AH_0			AH_0	AH_0	
CI						BH_0									
CP				AH_0							AH_0		AH_0		AH_0
ML							BH_0	BH_0		BH_0	BH_0			BH_0	BH_0
MR															
MI			BH_0	BH_0							BH_0				
MD												BH_0		AH_0 BH_0	BH_0
E	AH_0	AH_0		AH_0	AH_0										

Significant differences in mean scores occurred on twelve of the seventeen scales. The scales showing no significant differences were: CEA, CI, ML, MR, and MI.

Scale CAI, with a total of six, had the greatest number of significant differences in mean scores. Scales CSO, CEC, and CN each had five occurrences. Four occurrences existed for each of the scales CAI, E, CQ, and CP; and three instances were recorded for scale CAP. There were two occurrences for scale CAG, and one each for scales CSD and MD.

Uniform distributions were discovered for only two scales, CSO and CAT. The distributions were across the comparison pairs A/D, B/D, and C/D. The only scale showing a consecutive sequence was CN, which ranged from A/B through A/W.

Significant differences in variance scores occurred on six scales: CAG, CAI, CI, ML, MI, and MD. Twelve of the sixteen occurrences were on the content scales. Most of the occurrences were between the pairing of F and D grades with the other grade levels.

Sub-group III

This comparison group contained a total of one hundred and eighty-eight students. The grade distribution for this collection was as follows:

Grade A: twenty,
Grade B: forty,
Grade C: thirty-five,
Grade D: nineteen,

Grade F: five, and

Grade W: sixty-nine.

In this sub-group there were a total of fifty-four rejections of the Null Hypothesis, AH_0, and twenty-five rejections of the Null Hypothesis, BH_0. This results in rejection rates of twenty-one percent and ten percent respectively for AH_0 and BH_0. Table XIII shows the scale and comparison pair for which the measurable differences occurred.

TABLE XIII

TABLE OF NULL HYPOTHESES FOR SUB-GROUP III REJECTED ON THE BASIS OF THE "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

	COMPARISON PAIRS														
SCALE	A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP	AH_0		AH_0 BH_0			AH_0	BH_0			AH_0 BH_0		AH_0	BH_0	BH_0	
CSO	BH_0		AH_0 BH_0		AH_0 BH_0		AH_0		AH_0			AH_0			
CAG			AH_0		AH_0		AH_0		AH_0	AH_0		AH_0 BH_0			
CEC						AH_0	AH_0			AH_0 BH_0		AH_0		BH_0	
CAT			AH_0		BH_0	AH_0			BH_0					AH_0 BH_0	BH_0
CSD									AH_0						
CAI			AH_0		AH_0		AH_0		AH_0						
CEA	BH_0		AH_0			BH_0	AH_0 BH_0		BH_0						
CN		AH_0			AH_0	AH_0			AH_0 BH_0						
CQ					AH_0										
CI						AH_0	AH_0						AH_0		
CP									AH_0			AH_0			
ML										AH_0					
MR						AH_0									
MI			AH_0				AH_0			AH_0			AH_0	AH_0	
MD															
E	BH_0		AH_0		AH_0	AH_0	AH_0 BH_0	AH_0 BH_0	AH_0 BH_0			AH_0 BH_0			

Significant differences in mean scores occurred on every scale, except MD. Scale E had the most occurrences of significant differences with seven, followed by CAG with six. Five occurrences were observed for scales CAP, CSO, and MI. Scales CEC, CAI, and CN each showed four instances of significant differences. Three occurrences were recorded for CAT and CI; two for CEA and CP; and one each for scales CSD, CQ, ML, and MR.

There were seven scales showing uniform distributions of significant differences in mean scores: CSO, CAG, CAI, CEA, CN, MI, and E. Uniform distributions across the comparison pairs A/D, B/D, and C/D occurred for scales CSO, CAG, and MI. Significant differences for CEA and E were uniformly distributed over comparison pairs A/D and B/D. Scales CSO, CAG, CAI, and CN showed uniform distributions over A/W and B/W. Uniform distributions were observed across the comparison pairs A/W, B/W, and C/W for scales CSO, CAG, and E. No consecutive sequences existed for this sub-group.

There were twenty-five instances of measurable differences in variance scores. These differences appeared on eight scales. Scales CAP and E each had five occurrences, four each for CAT and CEA, three for CSO, two for CEC, and one occurrence for each of the scales CAG and CN. These scores were randomly distributed across the comparison pairs with the greatest frequency being on the conditions scales.

Sub-group IV

A total of forty-nine students was contained in this comparison group. The grade distribution for this group was as follows:

Grade A: twelve,
Grade B: eleven,
Grade C: eight,
Grade D: four,
Grade F: one, and
Grade W: thirteen.

There were thirty-three instances in which the Null Hypothesis, AH_0, was rejected and seven instances in which the Null Hypothesis, BH_0, was rejected. This yields a rejection rate of thirteen percent for AH_0 and a rejection rate of three percent for BH_0. Table XIV shows the scale and comparison pair for which the significant differences occurred.

TABLE XIV

TABLE OF NULL HYPOTHESES FOR SUB-GROUP IV REJECTED ON THE BASIS OF THE "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

SCALE	COMPARISON PAIRS A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP				AH_0				AH_0			AH_0		AH_0		AH_0
CSO															
CAG					AH_0							AH_0		AH_0	AH_0
CEC					BH_0					BH_0				BH_0	
CAT												BH_0			
CSD					AH_0		AH_0			AH_0			AH_0	AH_0	
CAI	BH_0					BH_0									
CEA			AH_0		AH_0										
CN			AH_0		AH_0		AH_0		AH_0				AH_0		
CQ							AH_0						AH_0		
CI															
CP															
ML															
MR			AH_0	AH_0	AH_0		AH_0			AH_0					
MI			AH_0												
MD					BH_0										
E		AH_0	AH_0	AH_0	AH_0										

Nine scales showed significant differences in mean scores for Sub-group IV. These differences occurred on four conditions scales, two content scales, two mode scales, and the expectancy scale. Scales CAP, CSD, CN, and MR each showed five occurrences; scales CAG and E each had four occurrences; scales CEA and CQ each had two occurrences; and scale MI had one comparison pair showing a significant difference.

Uniform distributions for scale CN were obtained for the pairs A/W, B/W, and for A/D, B/D. Scale MR showed a uniform distribution across A/D, B/D, C/D. A uniform distribution across A/F, B/F, C/F, D/F was observed for scale CAP. A consecutive sequence on A/C, A/F, A/W was observed for scale MR.

Significant differences in variance scores were obtained for scales CEC, CAT, CAI, and MD. There were three occurrences on CEC, two on CAI, and one each on scales CAT and MD.

Sub-group V

This sub-group contained a total of twenty-nine students. The grade distribution for this group was as follows:

Grade A: ten,
Grade B: eleven,
Grade C: six,
Grade D: one,
Grade F: zero, and
Grade W: one.

The Null Hypothesis, AH_0, was rejected in nine instances and the Null Hypothesis, BH_0, was rejection in five cases. The rejection rate for AH_0 was five percent and BH_0 had a rejection rate of three percent. Table XV shows the scale and comparison pair for which the significant differences occurred.

TABLE XV

TABLE OF NULL HYPOTHESES FOR SUB-GROUP V REJECTED ON THE BASIS OF THE "t" AND "F" STATISTICS APPEARING IN APPENDIX IX

SCALE	COMPARISON PAIRS A/B	A/C	A/D	A/F	A/W	B/C	B/D	B/F	B/W	C/D	C/F	C/W	D/F	D/W	F/W
CAP															
CSO		BH_0													
CAG		AH_0													
CEC															
CAT															
CSD															
CAI															
CEA		BH_0				BH_0						AH_0			
CN		AH_0													
CQ															
CI															
CP	BH_0	AH_0 BH_0	AH_0		AH_0										
ML															
MR															
MI															
MD												AH_0			
E		AH_0	AH_0												

Significant differences in mean scores resulted for scales CAG, CEA, CN, CP, and E. There were three occurrences on scale CP, two occurrences on scale E, and one occurrence on each of the remaining scales.

There were no uniform distributions on any scales for this sub-group. Since no F grades existed in this case, the sequence A/C, A/D, A/W was considered as consecutive for scale CP.

Significant differences in variance scores occurred on three scales: CSO, CEA, and CP. The distributions of these differences were random.

Cumulative Analysis of The Twelve Comparison Groups

As noted on page 90, there were ten uniform distributions in significant differences of mean scores identified as being desirable patterns that were to be sought throughout the twelve comparison groups. The degree of existence of these patterns throughout the comparison groups is presented in terms of their frequency of occurrence. These frequencies are summarized in Table XVI.

TABLE XVI

TABLE SHOWING FREQUENCIES OF UNIFORM DISTRIBUTIONS OF SIGNIFICANT DIFFERENCES IN MEAN SCORES FOR THE TWELVE COMPARISON GROUPS

SCALES	UNIFORM DISTRIBUTION NUMBERS 1	2	3	4	5	6	7	8	9	10
CAP				1	1	1				
CSO		3	3				4	2		
CAG		1	1				4	4		
CEC				1	1	1				
CAT	1	4	3	1	1	1	1			
CSD		1								
CAI	1	1					1			
CN	3	2		2	1	1	5			
CQ										
CI	2		1							
CP	1			3	1		1			
ML				1						
MR		3	2							
MI	1	4	1	1	1					
MD										
E	4	3		4			2	2		

There were ten possible occurrences for each of the distributions two through six and twelve possible occurrences for the remainder. Table XIV shows that for each uniform distribution of significant differences in mean scores, consistency of occurrence throughout the comparison groups was not more than fifty percent. With the exception of distribution seven on scale CN, consistency was not more than forty percent. Also, with the exceptions of distributions one and four on scale E for the instructor sub-groups, less than fifty percent consistency in uniform distributions of significant mean scores was obtained for Comparison Group II and Comparison Group III. For Comparison Group II, the students partitioned according to instructor, the consistency rate for distributions one and four on scale E was exactly fifty percent.

There were six scales, E, CN, CEA, CAI, MR, and CP that showed consecutive sequences. However, none of these scales had the same consecutive sequence appearing in more than one comparison group.

Significant differences in variance scores were, in general, randomly distributed throughout the comparison groups.

Part II: Comparisons of Learning Styles and Teaching Styles

Introduction

The purpose of this part of the results chapter is to report the degree of comparison that existed between the "Teaching Styles" of a given instructor and the "Learning Styles" of the students enrolled in the courses taught by the instructor. The students grouped according to instructor were defined in "Comparison Group II" of "Part I" of this chapter.

The measurements taken on the "Learning Styles Inventories" appear in Appendix VIII, and the measurements taken on the "Teaching Styles Inventories" appear in Appendix X. The probability distributions of the "Teaching Styles Inventories" and the "Learning Styles Inventories" that were used in the "Goodness of Fit Test" appear in Appendix XI. The Chi-Square test statistics used in the "Goodness of Fit Test" comparisons appear in Appendix XII.

The following are the forms of the hypotheses tested in Part II.

There is no significant difference between the "Teaching Styles Inventory" distribution of a given instructor and the "Learning Styles Inventories" of his students achieving a given grade level. The Null Hypothesis is stated as follows:

$$\text{Null Hypothesis, } H_0 : P(Z_i) = P(X_i)$$

The symbol Z_i represents a score on a given scale of the "Teaching Styles Inventory" for a given instructor and X_i represents a mean score of a given scale of the "Learning Styles Inventory" for a given grade achievement group. $P(Z_i)$ and $P(X_i)$ represent the probabilities of the scores Z_i and X_i respectively.

The following table shows the status of the Null Hypothesis, H_0, as it relates to each instructor and the corresponding student grade achievement groups. The status of the hypothesis is determined by the Chi-Square statistics in Appendix XII. The asterisk used in the table denotes rejection of the Null Hypothesis, H_0.

TABLE XVII

TABLE SHOWING STATUS OF THE NULL HYPOTHESIS H_0 BASED ON CHI-SQUARE STATISTICS IN APPENDIX XII

INSTRUCTOR	Grade A	Grade B	Grade C	Grade D	Grade F	Grade W
One	*	*	*	*	*	*
Two	*	*	*	*	*	*
Three	*	*	*			*
Four	*	*	*	*	*	*
Five	*	*	*	*	*	*
Six	*	*	*	*	*	*

The table shows there is a significant difference between "Learning Styles" and "Teaching Styles" whenever a given instructor is compared to a given group of his students achieving a common grade level.

The Chi-Square statistics in Appendix XII show the "Best Fit" of "Learning Styles" to "Teaching Styles" occurs, with the exception of instructor one, between the instructor and the student groups achieving the higher grade levels. The "Worst Fit" of "Learning Styles" to "Teaching Styles" occurred, with the exception of instructor five, between the instructor and the student groups achieving the lower grade levels. These results are summarized in Table XVIII.

TABLE XVIII

TABLE SHOWING "BEST FIT" AND "WORST FIT" COMPARISONS OF TEACHING STYLES TO LEARNING STYLES BASED ON CHI-SQUARE SCORES IN APPENDIX XII

INSTRUCTOR	"Best Fit"	"Worst Fit"
One	Grade D	Grade F
Two	Grade A	Grade F
Three	Grade A	Grade W
Four	Grade B	Grade F
Five	Grade A	Grade C
Six	Grade A	Grade D

Summary

In this chapter the results, as based on the statistical anaylses, have been reported. These consisted primarily of presenting in two parts the statistics of each of the Null Hypotheses tested.

Part I was a comparison of "Learning Styles" to "Learning Styles" for three major comparison groups of students. In Part II "Learning Styles" were compared to "Teaching Styles."

The tests of two types of Null Hypotheses, AH_0 (mean scores) and BH_0 (variance scores) were conducted in Part I. Each hypothesis was tested for fifteen distinct comparison pairs on the seventeen scales of the "Learning Styles Inventory." The total numbers of tests for each of these Null Hypothese was two thousand four hundred and sixty-five. AH_0 was rejected in four hundred and sixty-one instances and BH_0 was rejected in two hundred and twelve instances.

A search was made for two types of patterns in the rejection of the Null Hypothesis, AH_0: (1) a uniform distribution whenever a lower grade was held fixed and compared with higher grades, and (2) a consecutive sequence whenever a higher grade was held fixed and compared with lower grades. These patterns were found to exist for given comparison groups, but they were not consistently present throughout a majority of the comparison groups.

There were rejections of the Null Hypothesis, BH_0, in each comparison group. On occasion, the rejection patterns of AH_0 were also observed for BH_0. However, in general, the rejection patterns of BH_0 were found to be random distributions.

In Part II, the "Teaching Styles Inventory" distributions were compared to the "Learning Styles Inventory" distributions. In these comparisons the results of testing the Null Hypothesis, H_0 were presented. The hyopthesis, H_0 was tested in twenty-eight distinct cases. The rejection rate for H_0 was one hundred percent.

The results of Part II also revealed that the "Best Fit" of "Teaching Styles" to "Learning Styles" occurred between the instructor and the highest grade level achievement group; and the "Worst Fit" of "Teaching Styles" to "Learning Styles" occurred between the instructor and the lowest level achievement group.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The intent in this chapter is to present the major observations and recommendations resulting from this study. The chapter is divided into two parts: conclusions and recommendations.

The conclusions section deals with four major areas of observation: (1) administration of the measuring instruments, (2) effectiveness of the measuring instruments in typing different "Learning Styles" of norm groups, (3) effectiveness of the measuring instruments in establishing a relationship between "Teaching Styles" and "Learning Styles," and (4) future use of the measuring instruments.

In the recommendations section some uses of the instruments in the design of instructional strategies are suggested.

Conclusions

Administration of the Measuring Instruments

The conclusions presented in this section are not based on the statistical analyses of the study, but are observations that have been gained through the mechanics and logistics of gathering the data for this study.

Easeful administration is definitely a characteristic of both the "Learning Styles Inventory" and the "Teaching Styles

Inventory." Both instruments are compact with straight-forward completion instructions. Supporting documentation of this observation is given by the fact that only four of the five hundred and seventy-five participants in the study failed to complete the "Learning Styles Inventory" correctly. This is highly significant when one considers the broad range (remedial mathematics to calculus) of academic skills of the sample.

The time required for completion of the "Learning Styles Inventory" was approximately forty minutes. There were a few instances of students in the areas of remedial and intermediate mathematics where more than an hour was needed to complete the "Learning Styles Inventory." However, this was probably due to poor reading skills on the part of the student rather than a shortcoming of the instrument. Although the "Teaching Styles Inventory" as compared to the "Learning Styles Inventory" contained fewer questions (twenty-five compared to thirty), completion time of the "Teaching Styles Inventory" was approximately forty-five minutes. The additional completion time required on the "Teaching Styles Inventory" was probably due to an increased awareness on the part of the instructors of the teaching/learning process. This awareness of the instructors most likely resulted in a more thorough analysis of the questions by the instructors than by the students.

Informal conversations were held with some participants of the study to gain their reactions to the "Learning Styles Inventory." These students reported that completion of the inventory was a pleasant experience. In general they were pleased because it indicated an interest in them as individuals and it also caused them to analyze their own learning techniques. The instructors enjoyed completion of the "Teaching Styles Inventory" because it increased their awareness of the individuality of teaching/learning styles.

To summarize this section, both instruments are easy to administer, and the time and effort required for administration is adequately compensated by the increased awareness of the individuality of the teaching/learning process.

Effectiveness of the "Learning Styles Inventory" in Typing Different "Learning Styles" of Norm Groups

Conclusions presented in this section are based upon the statistical results of the study. These results are measures of central tendency, variability and significant differences obtained by the various norm groups established within the sample.

Based upon the statistical evidence of this study, the "Learning Styles Inventory" does detect individual differences in "learning styles." For a given comparison group these differences may frequently appear in the form of uniform patterns on certain scales, whenever the various grade levels are compared. However, in general, the existence of a pattern in one norm group does not imply its existence in another norm group. This suggests that, in its present form, the "Learning Styles Inventory" does not predictably identify mathematics students of a given grade achievement level.

Since the norm groups in this study were the natural strata of placement (total group) and instruction (course and instructor), it appears that the instrument has no apparent function in the design of instructional strategies based solely upon the mean scores of the norm groups. However, the variations in individual differences of "learning styles" within a given comparison (norm) group suggests consideration should be given to delivery systems that will provide for these individual differences.

The existence of uniform patterns within a given comparison group suggests that further statistical studies in which more variables are controlled may be in order. In particular, a discriminant analysis that considers past performance might yield more predictable patterns than the analyses used in this study. Since the strongest consecutive sequences occurred on scales CN and E, precision in scoring the instrument might be improved by developing a scoring function other than the current linear one.

In summary, the "Learning Styles Inventory" does reveal patterns of individual differences whenever the comparison groups are considered independently, but generally, consistent patterns do not occur if the groups are considered collectively. In any case, the instructor should be prepared to deal with a varying degree of "learning styles" regardless of whether students are grouped homogenously or heterogenously with respect to academic skills.

Effectiveness of the "Learning Styles Inventory" and the "Teaching Styles Inventory" in Establishing a Relationship Between "Learning Styles" and "Teaching Styles"

Conclusions presented in this section are based upon the statistical results of the study. These results are the comparison measurements between "Teaching Styles" and "Learning Styles" which appear in Appendix XII.

The statistical results show significant differences in every instance between "Teaching Style" distributions and "Learning Styles" distributions; and in general the "Learning Styles" of the students achieving the higher grade levels are more closely matched to "Teaching Styles" than those of students achieving the lower grade levels. This is inclusive evidence that the "Teaching Styles" currently in practice in the Mathematics Department at Manatee Junior College are better suited to the "Learning Styles" of student groups normed according to grade level achievement. Therefore it seems reasonable to conclude that matching of "Learning Styles" and "Teaching Styles" between students and instructors would likely result in the improvement of grade achievement levels if the present criteria (see Chapter III) for placing students is maintained.

Future Use of the "Learning Styles Inventory" and the "Teaching Styles Inventory"

The previously stated results and conclusions suggest a variety of patterns of "Learning Styles" and "Teaching Styles" whenever students are grouped according to traditional norms. This is not to imply that differences in "Teaching Styles" and

"Learning Styles" do not exist. It only shows that these "styles" become less distinguishable in norm groups limited to the single discipline of mathematics, as compared to inter-disciplinary groups (Canfield, 1973, p. 18). Therefore, in order to make effective use of the "Learning Styles Inventory" and the "Teaching Styles Inventory" in the design of instructional strategies in the area of mathematics, efforts should be made to place students on the basis of their "Learning Styles" rather than attempt to deal with differences in "style" after the student has already been placed in a given course.

Summary of the Conclusions Section

The "Learning Styles Inventory" and the "Teaching Styles Inventory" are instruments that were simple to administer and they provided a pleasant and meaningful experience for those participating in the study. The "Learning Styles Inventory" did not provide a consistent discriminatory function in typing different "Learning Styles" as applied collectively to the norm groups used in this study. Although, uniform patterns do exist whenever the comparison groups are viewed independently. "Learning Styles" of students achieving higher grade levels are better suited to given instructor's "Teaching Styles" than those of students achieving the lower grade levels.

Recommendations

Introduction

In view of the stated results and conclusions of this study, there are certain courses of action suggested. These activities are suggested in terms of the constraints currently existing at Manatee Junior College. For the most part, the recommended activities are those that provide an answer to the central question in Chapter I and can be undertaken in the immediate future. Following the specific recommendations there is a brief statement dealing with the extension of the recommendations to a broader scope.

Target Group of the "Learning Styles Inventory"

The results of the study suggest that individual differences in "Learning Styles" can be derived from the "Learning Styles Inventory" when it is administered to student groups that are normed by course. Therefore, it should be used in the context of an individual student and in a learning setting where individual differences can be taken into account in the instructional process.

At present, all remedial mathematics courses are conducted in a laboratory setting that provides for individual differences in learning rates. A skills bank containing materials that utilize various learning modes is available in the laboratory. Therefore, courses (such as Math 100) conducted in this setting provides a natural setting for implementation and utilization of the "Learning Styles Inventory."

Administration of the "Learning Styles Inventory"

Proper utilization of the "Learning Styles Inventory" requires correct timing of its administration. Current procedures in the Math 100 courses call for the administration of a diagnostic test during the first class meeting to assess the student's mathematical skills. Since students entering remedial courses such as Math 100 are usually low in internal motivation and have a record of a high failure rate, a less adverse psychological impact would likely be achieved if the diagnostic tests were postponed until the second or third class meeting.

Therefore, it is recommended that the "Learning Styles Inventory" be administered at the first class meeting of the Math 100 courses instead of the diagnostic test. This would provide the student with a pleasant experience (see the conclusions section) that is non-judgmental of his academic deficiencies. It would also serve as an emphasis on his individuality and make known the effort being undertaken to meet his individual needs as a learner. Also, by studying the results of the inventory, the laboratory instructional personnel would "get to know" the student much earlier than would otherwise be possible.

Scoring the "Learning Styles Inventory"

In its current form the "Learning Styles Inventory" is designed for manual scoring. This procedure is too cumbersome for the immediate feedback needed to use the inventory in the design of learning activities. The procedure as used in this study of converting the completed inventories to punched cards and then scoring by computer also requires too much "turn around" time.

Therefore, it is recommended that an answer sheet be designed for the "Learning Styles Inventory" that can be scored directly by computer. Conversations conducted with a programmer at Manatee Junior College indicated that direct computer scoring of the inventory was feasible. This would also provide direct input of the data into the computer, and thus be available for any processing that would be desired.

Interpretations of the "Learning Styles Inventory"

Since norms for each of the scales on the "Learning Styles Inventory" have been established by this study, a comparative judgment of the scale scores of the inventory is now possible.

From a practical standpoint, a scale score greater than the normed mean should be classified as a low preference and a scale score lower than the normed mean should be classified as a high preference. Assuming the inventory has been scored by computer, these classifications could also be computer determined. After the classification has been accomplished, a prescription of learning activities that best accommodates the student's preferred "Learning Style" can be produced.

At this point the actual writing of the individual "learning prescriptions" could also be accomplished by use of the computer. In Chapter II of this study suggestions of learning activities that are likely to be well received by those individuals indicating a high preference on a given scale were presented. The essence of these statements could be stored in the computer and a prescription could be written by having the computer print those suggestions for a given scale whenever a high preference score is achieved on that scale. A graphical display of the individual "learning prescriptions" could also be achieved by computer print-out. This display should be in the form of the "Instructional Activity Matrix" appearing in Appendix VII.

Upon receipt of a student's computer generated prescription the laboratory personnel would then be able to chart a specific set of learning activities that would direct the student toward achievement of the stated performance objectives of the course.

Cost of the Proposed Recommendations

Two basic components are needed for the proposed utilization of the "Learning Styles Inventory:" (1) a learning environment that provides for individual differences, and (2) computer facilities. Manatee Junior College is possessor of both components in the form of its mathematics laboratory and computer center. Therefore, implementation of these recommendations is a case of more utilization of facilities rather than an instance of additional costs. Copies of the "Learning Styles Inventory" would have to be purchased but are available at a nominal cost.

Suggestions for the Future

If the initial experience with the "Learning Styles Inventory" should prove successful in the Math 100 area, consideration should be given to combining the "learning style prescription" with "content prescriptions." This would produce a total individual learning package for each student in remedial mathematics.

The concept of prescription writing to include course content could be accomplished by a procedure similar to that described for "learning styles prescriptions." The performance objectives (Chapter III) and the learning skills bank could be stored in the computer. The diagnostic tests could be computer scored, and the computer could then perform a discriminatory function similar to that performed with respect to the "Learning Styles Inventory." The appropriate topics and learning aids would then be displayed by computer print-out.

The combination of these two components would produce an "individual learning package" that would indicate what the student is to learn and the best means for accomplishing the learning.

Summary of the Recommendations Section

Suggestions for the use of the "Learning Styles Inventory" have been presented in this section. They relate to utilization of the mathematics laboratory and computer facilities in the writing of "learning prescriptions" based upon the administration of the "Learning Styles Inventory."

It has been suggested that these recommendations are feasible in the immediate future and within the resources of Manatee Junior College. Suggestions for the inclusion of course content in developing "individual learning packages" in future prescription writing activities have been made.

Chapter Summary

Two types of conclusions were drawn in this chapter: Those based upon observations that resulted from the mechanics of the study, and those that resulted from the statistical analyses.

Participants in the study favorably received the measuring instruments, and through informal discussions with a selected number of participants it was indicated that the instruments accurately described individual learning/teaching styles.

From the statistical analyses it was concluded that the "Learning Styles Inventory" showed significant differences existing between the mean scores and variance scores of comparison pairs. Because there were also significant differences between "Teaching Styles" and "Learning Styles," it was concluded that an improvement in grade level achievement would likely result if students could be assigned to instructors whose "Teaching Styles" most closely reflect their "Learning Styles."

Recommendations for the use of the "Learning Styles Inventory" in remedial mathematics have been presented in this chapter, but are limited to those that are feasible within the constraints of the Manatee Junior College resources. These suggestions amount to utilization of the mathematics laboratory and computer facilities for the purpose of writing "individual learning prescriptions" based on the "Learning Styles Inventory scores.

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APPENDIX I

LEARNING STYLES INVENTORY

LEARNING STYLES INVENTORY

This inventory gives you opportunity to describe how you learn best. There are no right or wrong answers. You are to read each of the 30 items, and rank the responses according to how well they describe your reactions or feelings. The example below illustrates how the items are presented. Examine it carefully to be sure you understand how you are to mark your answers.

EXAMPLE:	ANSWER SHEET EXAMPLE:
32. Rank the following colors in the order in which you generally prefer them.	
a. Yellow	a. 4 (least preferred)
b. Red	b. 3 (third)
c. Blue	c. 1 (most preferred)
d. Green	d. 2 (second)

You must write a number in each blank on your answer sheet to indicate how well each response expresses how you feel. All four responses must be ranked (from 1 to 4) for each item.

Note that the items are numbered from the top to the bottom on the pages of this booklet and on your answer sheet.

If you are sure that you know what you are to do, begin. If you have a question, ask for assistance before starting.

Please be sure you put a different number in each response blank to indicate whether you ranked the response 1st, 2nd, 3rd or 4th. Do not leave any items unanswered.

1. Rank the following in terms of how well they describe the classes you've liked most. (1 for the most descriptive statement, 2 for the second most, etc.)

   a. I enjoyed the other students and we shared our ideas and feelings with each other.

   b. The course was well organized and the topics followed one another in a meaningful sequence.

   c. I more or less set my own goals and studied the things of most interest to me.

   d. I knew how my work compared with others and the best work was fairly recognized.

2. Number the following descriptions of teachers from 1 to 4 in the order in which you normally prefer them. (1 for the most preferred, etc.)

   a. Teachers who are pleasant, friendly, and who take a personal interest in me.

   b. Teachers who provide specific and clear information about assignments and requirements.

   c. Teachers who give me the opportunity to decide what I want to study and how I want to do things.

   d. Teachers who impose high standards and make me do the work necessary to accomplish them.

3. Rank the following courses in terms of their general appeal to you:

   a. Mathematics and physical science.

   b. Language and literature.

   c. Household and craft repair skills.

   d. Interviewing and counseling.

4. Rank the following in terms of their general value to you as ways to learn.

   a. Listening to others talk about a subject.

   b. Reading what others have written about it.

   c. Seeing pictures, graphs, movies, etc.

   d. Handling or working with something tangible.

5. Rank the following grades to indicate how likely you are to receive them on a paper or a report.

   a. Excellent or outstanding.

   b. Good or above average.

   c. Satisfactory or about average.

   d. Unsatisfactory.

6. Rank the following in the order in which they would be most helpful for improving your school experience in general.

   a. There were more group activities and opportunities to get to know other students.

   b. There were more class outlines and clearer statements about what the classes were all about.

   c. There were more opportunities to think through my capabilities and set goals for my own performance.

   d. There was more objective and frequent information on how my performance compares with others.

7. Rank the following in terms of how accurately they describe the worst teachers you've known.

   a. They were more interested in the subject matter than in the students.

   b. They were vague about assignments and I was never sure what was expected of me.

   c. They were too restrictive in letting me do things on my own, coming to my own conclusions, etc.

   d. They were too easy and the students lost respect for them.

8. Rank the following in the order in which you enjoy doing them.

   a. Figuring out how things differ in cost.

   b. Writing a report or a letter.

   c. Building or repairing something.

   d. Carrying on a conversation with a stranger.

9. Classes typically involve the following kinds of teaching activities. Rank them in the order in which you generally prefer them as ways to learn.

   a. Lectures, audio tapes, and question-answer sessions.

   b. Textbook assignments and other readings.

   c. Movies, slides, graphs, charts, etc.

   d. Experiments or projects in the laboratory.

10. Imagine that you have just received your grade on the final examination in a course that you felt was pretty easy and that you got the lowest grade in the class. Rank the following as to how you'd most likely feel.

   a. Somebody made a mistake in grading the papers.

(continued)

10. (continued)

   b. I'd be quite surprised, because that doesn't happen very often.

   c. It would surprise me a little, but that sometimes happens.

   d. It wouldn't surprise me very much at all.

11. In most courses, student performance is evaluated on some basis. Rank the following in terms of how you feel about such evaluations.

   a. They sometimes create jealousies and hard feelings among the students.

   b. Sometimes they are unrelated to the supposed content and purposes of the course.

   c. They sometimes aren't very helpful in evaluating my progress or in helping me focus my study activities.

   d. Sometimes they don't really distinguish between those who are doing well and those not doing so well.

12. Rank the following in terms of their value to you in learning.

   a. Having a chance to visit informally and develop an effective relationship with the teacher.

   b. Having specifics on what courses include and what they require.

   c. Having the chance to adopt my own approach and to make some contribution of my own.

   d. Having scholarly teachers explain the material and direct my study in the most meaningful and useful direction.

13. If you were in a course that required everyone to visit a home for the elderly, and you could do any of the following, rank them in the order of their interest to you.

    a. Help them compute their income taxes or balance their checkbooks.

    b. Write a letter or read to them.

    c. Help repair or replace something for them.

    d. Sit and visit with them about their feelings.

14. How do the following appeal to you as ways to find out about new occupations or types of work?

    a. Have someone in the field tell me about it.

    b. Read a recent study explaining it.

    c. Watch a classroom demonstration of the work.

    d. Trying to do the work itself.

15. Imagine that you have just turned in a paper to an instructor. Place a one by the letter of the response that describes how you think it would be most likely evaluated, a two by the second most likely, etc.

    a. Excellent

    b. Above average

    c. Average

    d. Below average

16. As a student, I feel it is my responsibility to:

    a. Cooperate with the other students and help them when I can.

    b. Ask the teacher questions when the course is confusing.

(continued)

16. (continued)

c. Make my own decisions as to what I can accomplish.

d. Assess the ability of the other students and work accordingly.

17. Consider the following topics for teacher training and rank them in the order in which you think they would generally be most helpful to teachers.

a. How to get along with students and maintain good relationships with them.

b. How to inform students of requirements, rules, the basis for grades, etc.

c. How to utilize independent study techniques so students can work more or less on their own.

d. How to maintain classroom discipline and get students to do the assigned work.

18. Rank the following classes in the order in which they appeal to you.

a. Formal logic and mathematics.

b. Developing the plot and writing short stories.

c. Operating a machine to make something.

d. Human behavior and the "helping" occupations.

19. Rank the following in the order in which you would typically like to learn about the properties of a new plastic.

a. Hearing a lecture.

b. Reading a book or text.

c. Viewing a movie or slides.

d. Experimenting with a small sample.

20. Assume you are going to be in school next year, and rank the following evaluations in the order in which you think you'd receive them.

a. In the top 10% or so.

b. In the top 25 or 33 percent.

c. In the middle 50 percent.

d. In the bottom 25 or 33 percent.

21. Rank the following in terms of how accurately they describe the classes you have DISLIKED.

a. There was a lot of arguing, bickering, or fighting among the students.

b. The class was disorganized and I couldn't tell what topic was coming next.

c. There was no opportunity for me to pursue my own special interests or branch off on anything.

d. No matter how well or how much anyone did, the teacher just accepted it.

22. Rank the following in the order in which you feel they describe your most effective teachers.

a. They like students and have a sincere desire to understand and help them.

b. They leave no confusion about what is to be done and how it is to be done.

c. They consider each person as an individual and let each student work to his abilities and interests.

d. They control their classrooms and require everyone to meet some minimum requirements.

23. Club members are generally required to help in some way, rank the following in order of your preference for doing them.

a. Keeping the books on income, expenses, and finances.

(continued)

23. (continued)

b. Keeping the minutes of the meetings and doing the correspondence.

c. Setting up the room and keeping club equipment in order.

d. Greeting newcomers and helping everyone feel welcome.

24. Suppose you were taking a course in Ecology. Rank the following in terms of how you'd like to study the topic.

a. Hear speeches by qualified people.

b. Read reports and studies.

c. Watch movies, TV, films, etc.

d. Take field trips.

25. Rank the following in terms of how well they describe your feelings about your school performance.

a. I've been at or near the top of my class.

b. I've been better than average.

c. I've been near the middle.

d. I've been in the lower half.

26. Rank the following in their importance to you in the way classes are handled.

a. There is an opportunity to develop friends and the students support one another.

b. The class sessions are logically related to each other and the topics follow in an understandable and meaningful sequence.

d. Based upon the topic and my abilities, I can determine what areas I'll pursue.

27. Rank the following in terms of how likely they would be as a reason for you to dislike a class.

    a. The teacher was hostile, easily angered, or inconsiderate.

    b. There were vague standards and vague or frequently changing requirements.

    c. There was too little opportunity to determine my own activities.

    d. The teacher lacked the ability to direct and control the class.

28. Rank the following in terms of their interest to you as a general field of work.

    a. Mathematics, engineering, accounting.

    b. Language, writing, speaking.

    c. Building, installing, operating equipment.

    d. Interviewing, selling, teaching.

29. Rank the following class activities in the order in which they normally appeal to you.

    a. The teacher lectures and answers questions.

    b. I can read about the topic in a text or some outside reading.

    c. Pictures, movies, graphs, displays, etc., are used.

    d. I can experiment with or actually use the material.

30. Imagine that you've just received the results of a final examination in a very difficult course and your grade was the highest in the class. Rank the following in terms of how you would most likely feel.

    a. I'd have expected to do well so it wouldn't surprise me.

(continued)

30. (continued)

b. I'd be surprised, but it could happen.

c. I'd feel like I had lucked out and guessed a lot of the correct answers.

d. I'd probably think that someone had made a mistake in grading the test.

APPENDIX II

TEACHING STYLES INVENTORY

TEACHING STYLES INVENTORY

This inventory gives you an opportunity to describe how you prefer to teach. There are no right or wrong answers, so be as honest with yourself as you can. Read each of the 25 items, and rank the four responses according to how well they describe your personal reactions or feelings. The example, below, shows how the items are presented and how you are to mark your responses. Examine the item carefully to be sure you understand how your answers are to be marked on the answer sheet.

EXAMPLE ITEM:	EXAMPLE ANSWER SHEET RESPONSE:
Rank the following colors in the order in which you typically prefer them.	
a. Yellow	a. 1 (Most preferred)
b. Green	b. 4 (Least preferred)
c. Red	c. 3 (Third most preferred)
d. Blue	d. 2 (Second most preferred

It is most important that you write numbers in the blank spaces on the answer sheet to indicate the order of your preferences. All four of the responses must be ranked (from 1 through 4) for each item. Leave no spaces or items blank.

If you are sure that you know what to do, turn the page and begin. If you have any questions, ask for assistance before starting.

1. Rank the following in the order in which they would be helpful in improving teaching in general.

   a. More group activities and more opportunities for the students to get to know each other well.

   b. Projects, assignments, and presentations more directly related to course content.

   c. More emphasis on letting the students think through their capabilities and set goals for their own performance.

   d. More objective and frequent information so the students could better judge their performance in relation to others.

2. Rark the following in the order in which you feel they describe the most effective teachers.

   a. They like students and have a sincere desire to understand and help them.

   b. They are precise about what is to be done, how it is to be done, when it is to be done, etc.

   c. They consider each person as an individual and let students work to their individual abilities and interests.

   d. They control their classroom and require everyone to meet some minimum requirement.

3. Rank the following kinds of courses in terms of their general appeal to you.

   a. Science/Mathematics

   b. History/Literature

   c. Laboratory/Shop/Clinic

   d. Psychology/Sociology

4. Teaching typically involves the following kinds of activities. Rank them in the order in which you typically prefer doing them.

   a. Giving lectures, making audio tapes, handling question-answer sessions.

   b. Preparing hand-outs, bibliographies, and writing supplementary reading materials.

   c. Preparing graphs, slides, charts, and using movies, videotapes, and other audio-visuals.

   d. Preparing experiments, conducting role plays, or arranging for field projects.

5. Generally speaking, I feel that the students who are doing very poorly in school

   a. Could probably do well if they received the type of instruction they need to learn the material.

   b. Would do OK if the faculty had more time to work with them.

   c. Have probably not done well in the past and are so far behind they'll probably never catch up.

   d. Shouldn't be in school at that stage of their lives.

6. Student performance evaluation is a typical part of the teacher process. Rank the following in terms of their likely negative consequences. (Give the most likely negative consequence a 1, etc., to a 4 for the least likely consequence.)

   a. They sometimes create jealousies and hard feelings among the students.

   b. Sometimes they are unrelated to the supposed content and purposes of the course.

   c. They sometimes aren't very helpful to the students in evaluating their progress and in helping them focus their study activities.

   d. Sometimes they don't really distinguish between those who are doing well and those not doing well.

7. Rank the following descriptions of teachers in the order in which they best describe you.

    a. Pleasant, friendly, and takes a personal interest in the students.

    b. Provides specific and detailed information about assignments and requirements.

    c. Gives students the opportunity to decide what they want to study and how they want to do things.

    d. Sets high standards and requires the students do the work necessary to accomplish them.

8. If your teacher's association had agreed to assist the residents of a home for the aged, rank the following in terms of your preference for doing them.

    a. Help them with income tax or financial matters.

    b. Read to them or write a letter for them.

    c. Help repair or replace things in the building.

    d. Sit and visit with small groups encouraging their interaction.

9. Rank the following in terms of your preference for using them to teach a class in ecology.

    a. Bring in an authority and have that person talk to the class.

    b. Have the students locate and read appropriate articles in newspapers and magazines.

    c. Locate and show appropriate movies and TV programs.

    d. Make arrangements for the students to work on a specific local problem.

10. Rank the following in the order in which you would typically do them if they were students in your class who appeared disinterested.

    a. Vary my approach and type of assignments to try and spark their interest.

    b. Put them with some of the better and more enthused students on a group project.

    c. Call on them more in class to try and force more application to their studies.

    d. Consider that it's the student's problem since basically it's their responsibility to get the material.

11. Rank the following in terms of their importance in conducting an effective class.

    a. The students share their ideas and enjoy one another.

    b. The course is well organized and the topics follow one another so they can be easily inter-related.

    c. Students are allowed to set their own goals and study those things of most interest to them.

    d. Frequent information is given the students on how their work compares and the best work was fairly recognized.

12. Rank the following topics for training in the order in which you think they would be generally most helpful to teachers.

    a. How to get along with students and maintain good relationships with them.

    b. How to determine and communicate to students the requirements for assignments, the basis for grades, etc.

    c. How to utilize independent study techniques so students can work more or less on their own.

(continued)

12. (continued)

    d. How to maintain classroom discipline and get students to do the assigned work.

13. Rank the following in the order in which you typically enjoy doing them.

    a. Solving mathematical puzzles.

    b. Solving crossword puzzles.

    c. Building or repairing something.

    d. Doing volunteer work with people.

14. If you were given the assignment to teach your colleagues about a new synthetic material, what would be your order of preference as ways of doing it.

    a. Through a prepared or extemporaneous talk.

    b. Provide a report and some literature from the manufacturer.

    c. Through a visual presentation showing how the material can be used.

    d. Provide people with samples of the material so they could experiment with it.

15. Rank the following in terms of their likely reasons for a student failing a course.

    a. The teacher didn't provide enough guidance or help.

    b. The student didn't ask for help when they ran into difficulty.

    c. The student didn't study enough.

    d. The student shouldn't have been enrolled in the class in the first place.

16. Rank the following in terms of how accurately they describe the characteristics of classes that students dislike.

    a. There is a lot of arguing, bickering, and fighting among the students.

    b. The class is disorganized and the students can't tell what topic is coming next.

    c. There is no opportunity for the students to pursue their own special interests or to branch off on anything.

    d. No matter how well or how little anyone does, the teacher just accepts it.

17. Rank the following in terms of their value in helping students learn.

    a. Having an opportunity to develop a good relationship with the teacher through informal discussions and personal contact.

    b. Having a detailed course outline and specific knowledge about what rules to be followed in submitting their work.

    c. Having a chance to adopt their own approach and make some contribution independently.

    d. Having scholarly teachers explain the material and direct their studies in the most meaningful and useful way.

18. Rank the following sections of a survey course in occupations in terms of their interest to you.

    a. Occupations in scientific research.

    b. Occupations in communications.

    c. Occupations in manufacturing.

    d. Occupations in the helping professions.

19. If you were teaching a course in "Tests and Measurements," rank the following in the order in which you'd most likely use them to evaluate your students.

    a. Oral examinations.

    b. Written examinations.

    c. Illustrated reports or audio-visual productions.

    d. An actual test they had produced.

20. In looking over the grades on an early examination in a course, suppose you found a few students who didn't seem to be getting much from the assignments or the class sessions. Rank the following in terms of how you would most likely feel about them.

    a. They needed some extra coaching and a change in instruction to better meet their needs.

    b. They probably weren't interested in the subject and something would have to be done to make them want to learn the material.

    c. They needed more time to learn the material and they should be given that extra time.

    d. They probably shouldn't be enrolled in the course and could better spend their time doing something else.

21. Rank the following teacher's responsibilities in terms of their importance.

    a. Get the students to cooperate with and help one another.

    b. Organize course content and probrams in a logical and meaningful order.

    c. Encourage the students to make their own decisions as to what they can accomplish.

    d. Motivate students to do the best work of anyone in the class.

22. Rank the following in terms of how accurately they describe the worst teachers you've known.

   a. They were more interested in the subject matter than in the students.

   b. They were vague about assignments and the students were never sure of exactly what was expected of them.

   c. They were too restrictive and did not let the students come to their own conclusions or do things on their own.

   d. They were too easy and the students lost respect for them.

23. If you were required to perform one of the following jobs for a service group during the coming year, rank them in the order of your preference for doing them.

   a. Act as treasurer and handle the books.

   b. Keep the minutes of the meetings and handle the correspondence.

   c. Keep the supplies, equipment, and meeting place in good condition.

   d. Greet newcomers and help everyone feel welcome.

24. If you were asked to present a plan for a multi-purpose classroom to a group of school administrators, rank the following in terms of your preference for making the presentation.

   a. A speech from prepared notes.

   b. A written report.

   c. Blueprints and sketches.

   d. A scale model.

25. Rank the following in terms of what you would likely do if a few of the better students in a class either dominated it with questions or became disruptive.

    a. Give them a special project which requires them to go into more depth than the regular class and let them present their findings.

    b. Talk with them, let them know I understand their situation, and ask them to cooperate with me.

    c. Ignore their behavior and hope the class would help control their behavior.

    d. Suggest to the students that they transfer to another class.

APPENDIX III

LEARNING STYLES INVENTORY
ANSWER SHEET

LEARNING
STYLES
INVENTORY
SEPTEMBER 1975

Name: ______________________________
(Last) (First) (Mid. Initial)
Student Number: ____________ Grade: ______
Class: ______________ Age: ______ Sex: ____ (M - F)
Instructor: ______________________________

DIRECTIONS: Be sure you enter a different number in each blank to indicate the responses to each item. (1 by the letter of the most descriptive response, 2 by the second most descriptive, etc., through 4). The item numbers go down the page, as in the booklet.

1.a) ____	6.a) ____	11.a) ____	16.a) ____	21.a) ____	26.a) ____
b) ____	b) ____	b) ____	b) ____	b) ____	b) ____
c) ____	c) ____	c) ____	c) ____	c) ____	c) ____
d) ____	d) ____	d) ____	d) ____	d) ____	d) ____
2.a) ____	7.a) ____	12.a) ____	17.a) ____	22.a) ____	27.a) ____
b) ____	b) ____	b) ____	b) ____	b) ____	b) ____
c) ____	c) ____	c) ____	c) ____	c) ____	c) ____
d) ____	d) ____	d) ____	d) ____	d) ____	d) ____
3.a) ____	8.a) ____	13.a) ____	18.a) ____	23.a) ____	28.a) ____
b) ____	b) ____	b) ____	b) ____	b) ____	b) ____
c) ____	c) ____	c) ____	c) ____	c) ____	c) ____
d) ____	d) ____	d) ____	d) ____	d) ____	d) ____
4.a) ____	9.a) ____	14.a) ____	19.a) ____	24.a) ____	28.a) ____
b) ____	b) ____	b) ____	b) ____	b) ____	b) ____
c) ____	c) ____	c) ____	c) ____	c) ____	c) ____
d) ____	d) ____	d) ____	d) ____	d) ____	d) ____
5.a) ____	10.a) ____	15.a) ____	20.a) ____	25.a) ____	30.a) ____
b) ____	b) ____	b) ____	b) ____	b) ____	b) ____
c) ____	c) ____	c) ____	c) ____	c) ____	c) ____
d) ____	d) ____	d) ____	d) ____	d) ____	d) ____

APPENDIX IV

LEARNING STYLES INVENTORY
ANSWER SHEET (SCORING FORM)

LEARNING STYLES INVENTORY

Answer Sheet

(Scoring Form)

All rows summed across as below

1(a) + 6(a) + 11(a) + 16(a) + 21(a) + 26(a) = CAP
1(b) + 6(b) + 11(b) + 16(b) + 21(b) + 26(b) = CSO
1(c) + 6(c) + 11(c) + 16(c) + 21(c) + 26(c) = CAG
1(d) + 6(d) + 11(d) + 16(d) + 21(d) + 26(d) = CEC

2(a) + 7(a) + 12(a) + 17(a) + 22(a) + 27(a) = CAT
2(b) + 7(b) + 12(b) + 17(b) + 22(b) + 27(b) = CSD
2(c) + 7(c) + 12(c) + 17(c) + 22(c) + 27(c) = CAI
2(d) + 7(d) + 12(d) + 17(d) + 22(d) + 27(d) = CEA

3(a) + 8(a) + 13(a) + 18(a) + 23(a) + 28(a) = CN
3(b) + 8(b) + 13(b) + 18(b) + 23(b) + 28(b) = CQ
3(c) + 8(c) + 13(c) + 18(c) + 23(c) + 28(c) = CI
3(d) + 8(d) + 13(d) + 18(d) + 23(d) + 28(d) = CP

4(a) + 9(a) + 14(a) + 19(a) + 24(a) + 29(a) = ML
4(b) + 9(b) + 14(b) + 19(b) + 24(b) + 29(b) = MR
4(c) + 9(c) + 14(c) + 19(c) + 24(c) + 29(c) = MI
4(d) + 9(d) + 14(d) + 19(d) + 24(d) + 29(d) = MD

5(a) +10(a) + 15(a) + 20(a) + 25(a) + 30(a) = EA
5(b) +10(b) + 15(b) + 20(b) + 25(b) + 30(b) = EB
5(c) +10(c) + 15(c) + 20(c) + 25(c) + 30(c) = EC
5(d) +10(d) + 15(d) + 20(d) + 25(d) + 30(d) = ED

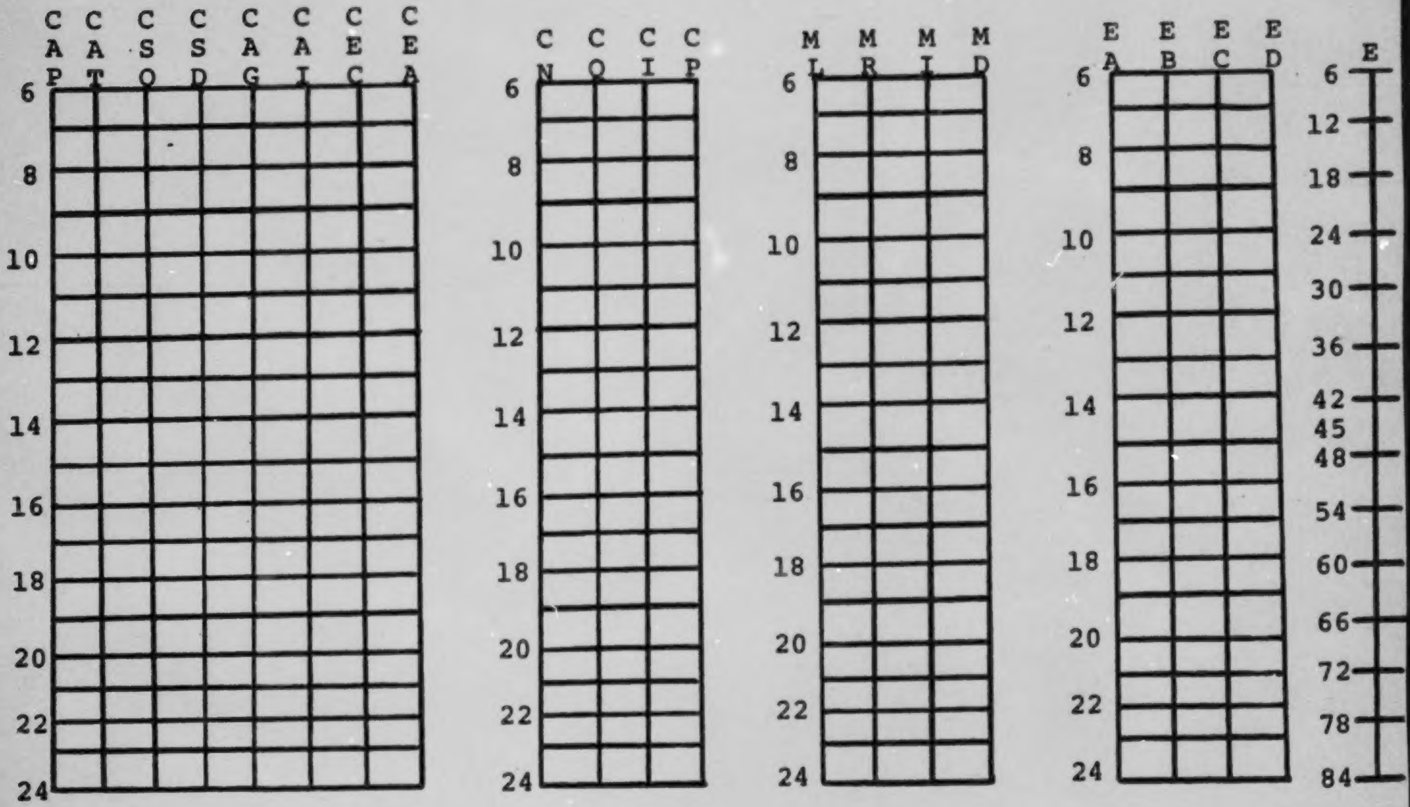
E = 3(EA) + (EB) - ED

APPENDIX V

LEARNING STYLES INVENTORY
RAW SCORE PROFILE

LEARNING STYLES INVENTORY (FORM S-A)

RAW SCORE PROFILE

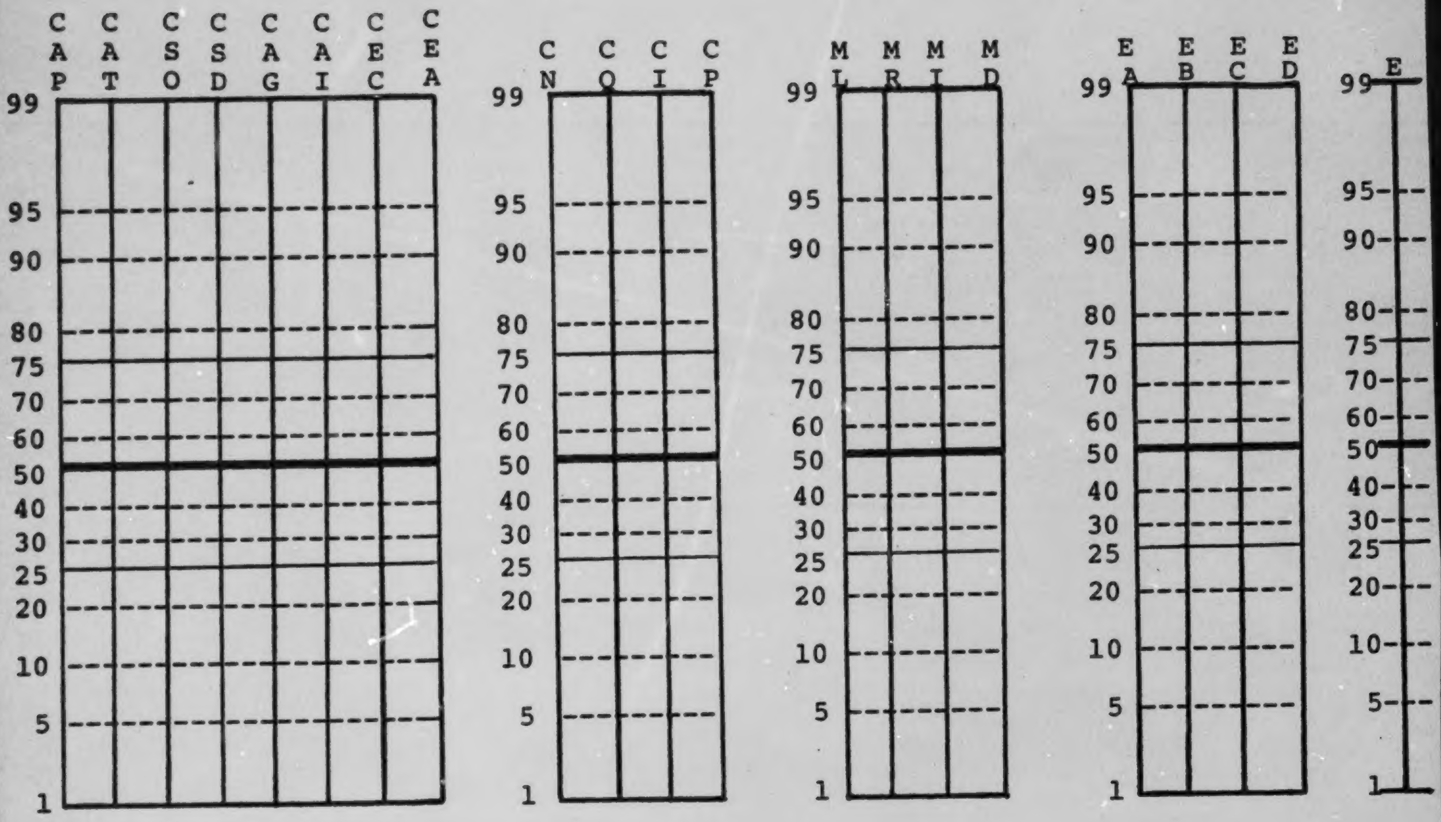


APPENDIX VI

LEARNING STYLES INVENTORY
PERCENTILE PROFILE

LEARNING STYLES INVENTORY (FORM S-A)

PERCENTILE PROFILE



APPENDIX VII

INSTRUCTIONAL ACTIVITY MATRIX PREFERENCE SCORE INTER-RELATIONSHIPS

INSTRUCTIONAL ACTIVITY MATRIX

PREFERENCE SCORE INTER-RELATIONSHIPS

Instructional Activity	High Preference Scores Suggested*											
CLASSROOM	CAP	CAT	CSO	CSD	CAG	CAI	CEC	CEA	ML	MR	MI	MD
Straight Lecture								*	*			
Lecture with summary notes			*					*	*			
Teacher questions students				*			*	*	*			
Guest/Outside speakers								*	*			
Student Presentations							*		*			
Small Group Discussion Teacher Led		*						*	*			
Student Led	*								*			*
Case study discussion						*	*		*			*
Case study reports			*	*		*				*		*
Movies, video, etc.								*			*	
Demonstrations			*	*				*			*	*
Practice Exercises					*	*	*					*
Simulations/games problem solving	*				*		*					*

INSTRUCTIONAL ACTIVITY MATRIX

PREFERENCE SCORE INTER-RELATIONSHIPS

Instructional Activity	High Preference Scores Suggested*											
FIELD TRIP/LABORATORY	CAP	CAT	CSO	CSD	CAG	CAI	CEC	CEA	ML	MR	MI	MD
Practice Laboratory				*		*						*
Observation Field Trip	*			*							*	*
Practicum/Internship			*		*	*						*
Cooperative Work/Study		*	*			*		*			*	*
Field data Collection				*		*				*		*
Literature Research			*	*		*				*	*	
INDEPENDENT STUDY												
Assigned Readings						*		*			*	
Taped Lectures						*		*	*			
Taped Lectures with visuals						*		*	*		*	
Taped Lectures with workbooks						*		*	*	*		
Operating models/ simulators			*			*					*	*
Displays, models				*		*		*			*	*
Charts, Graphs				*		*				*	*	
Movies, Film strip, etc.						*		*			*	
Student-student projects	*						*					*
Instructor-student conferences		*			*			*	*			*

INSTRUCTIONAL ACTIVITY MATRIX

PREFERENCE SCORE INTER-RELATIONSHIPS

Instructional Activity   High Preference Scores Suggested*

COURSE MANAGEMENT	CAP	CAT	CSO	CSD	CAG	CAI	CEC	CEA	ML	MR	MI	MD
Course Outlines			*	*						*		
Class schedules			*	*						*		
Detailed assignment sheets		*		*						*		
Objective examinations			*	*			*			*		
Essay examinations		*			*	*				*		
Pre-tests				*	*	*						*
Posting grades				*			*					*
Written performance objectives			*	*	*					*		*
Norm rereferenced tests				*			*				*	
Criterion referenced tests	*	*	*	*								*
Self analysis & evaluation					*	*						*
Performance contracts		*			*	*					*	*
Term Papers		*	*			*				*		

APPENDIX VIII

SCALE MEASUREMENTS OF THE LEARNING STYLES INVENTORY

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - TOTAL GROUP - N=571

SCALE	N=86		N=104		N=193		N=41		N=19		N=128	
	GRADE A		GRADE B		GRADE C		GRADE D		GRADE F		GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	16.18	11.70	16.75	10.91	15.63	10.60	16.31	7.14	15.73	13.45	17.01	11.35
CSO	10.32	6.66	10.59	7.83	11.13	8.76	11.95	10.04	10.21	7.32	11.27	8.38
CAG	15.36	12.95	14.73	10.81	14.74	8.21	13.95	8.77	14.15	9.92	13.11	9.46
CEC	17.97	9.37	17.83	8.61	18.18	7.60	17.46	11.61	19.36	6.44	18.20	7.49
CAT	13.65	12.08	13.36	12.17	12.77	14.70	11.07	7.53	13.15	11.50	13.35	17.43
CSD	12.82	12.93	12.53	12.55	13.38	10.51	13.80	9.76	12.00	9.89	13.20	11.38
CAI	17.51	17.08	17.32	13.77	16.75	11.64	17.53	9.12	17.21	13.00	16.37	14.09
CEA	15.88	11.91	16.73	16.65	16.92	11.86	17.17	7.21	17.63	7.91	17.07	12.67
CN	12.40	20.05	13.32	21.14	16.11	23.21	15.14	18.51	15.57	22.87	15.42	24.79
CQ	17.19	21.13	16.84	19.51	16.26	17.07	16.04	18.04	17.68	23.05	16.41	17.89
CI	15.17	22.51	14.75	24.39	14.16	19.46	14.14	14.90	14.78	17.32	14.28	23.86
CP	15.16	14.64	14.82	20.75	13.32	18.92	14.65	20.71	11.89	11.77	13.78	19.77
ML	13.75	16.06	13.66	14.39	13.55	14.45	13.60	18.33	13.21	21.53	13.64	14.52
MR	17.39	18.91	17.75	19.86	18.28	17.45	19.26	12.19	18.21	19.74	18.35	16.44
MI	15.96	19.66	15.60	16.43	14.53	17.00	13.41	10.38	15.00	5.78	15.49	16.76
MD	12.87	18.15	12.99	18.50	13.48	20.24	13.34	20.85	13.57	19.19	12.32	16.97
E	24.47	228.57	28.70	212.13	36.06	231.89	33.60	170.48	38.21	221.42	35.98	259.56

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - INSTRUCTOR 01 - N=113

SCALE	N=12 GRADE A MEAN	 VAR	N=15 GRADE B MEAN	 VAR	N=24 GRADE C MEAN	 VAR	N=10 GRADE D MEAN	 VAR	N=8 GRADE F MEAN	 VAR	N=44 GRADE W MEAN	 VAR
CAP	16.16	17.80	16.60	13.04	15.00	6.33	15.50	8.25	16.25	24.43	17.47	10.74
CSO	9.91	5.90	10.46	8.91	11.00	8.66	11.40	12.04	9.62	4.98	10.54	6.56
CAG	16.50	9.75	15.80	11.36	15.12	9.52	14.70	5.21	14.12	9.10	13.45	10.24
CEC	17.41	9.91	17.00	10.13	18.79	8.83	18.40	10.64	18.75	9.93	18.45	5.65
CAT	14.16	14.97	14.60	11.57	11.87	11.85	10.50	4.65	12.62	9.48	13.31	19.08
CSD	13.83	12.13	12.86	13.58	13.91	15.07	14.70	18.21	11.75	9.43	12.65	11.04
CAI	17.83	14.30	19.46	7.44	16.70	11.54	18.00	5.60	18.87	6.85	16.81	14.10
CEA	14.16	11.30	13.00	17.73	17.08	13.74	16.10	7.89	16.75	12.93	17.20	12.89
CN	10.58	10.57	10.93	6.32	13.00	20.91	12.90	12.09	13.37	16.98	15.15	30.45
CQ	17.00	14.16	18.60	16.24	17.95	14.29	17.60	11.04	18.87	12.85	16.34	15.86
CI	16.25	17.18	13.86	15.98	13.41	10.32	14.20	15.76	15.12	19.60	14.36	25.91
CP	16.16	17.80	16.60	16.37	15.54	16.91	15.30	26.21	12.62	6.48	14.13	21.66
ML	12.75	22.18	11.86	13.98	11.33	13.13	14.80	12.56	13.25	19.18	13.15	10.95
MR	17.08	14.74	15.53	16.11	16.37	21.65	19.90	8.29	18.00	25.50	18.45	17.88
MI	17.91	22.57	17.86	13.84	17.08	14.99	12.80	6.76	14.25	.93	15.56	20.70
MD	12.25	19.52	14.73	12.46	14.95	17.95	12.50	17.85	14.50	21.50	12.54	16.24
E	16.58	125.90	17.60	85.57	27.08	112.90	28.60	109.44	34.25	231.18	34.59	281.65

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - INSTRUCTOR 02 - N=143

SCALE	N=25 GRADE A MEAN	 VAR	N=23 GRADE B MEAN	 VAR	N=40 GRADE C MEAN	 VAR	N=9 GRADE D MEAN	 VAR	N=3 GRADE F MEAN	 VAR	N=43 GRADE W MEAN	 VAR
CAP	16.36	13.59	17.04	9.25	15.17	10.99	17.22	1.95	15.33	.88	16.48	12.43
CSO	9.84	5.01	10.04	10.04	11.00	8.10	12.33	10.44	8.00	2.00	11.48	7.64
CAG	15.88	10.74	14.78	11.56	15.20	6.11	13.55	11.80	17.33	.88	13.09	9.10
CEC	17.40	7.28	17.95	8.38	17.90	7.29	15.44	21.80	19.33	.22	18.04	6.97
CAT	13.28	9.24	12.73	12.10	12.17	11.89	10.11	3.87	12.00	2.66	12.86	15.09
CSD	11.88	7.78	12.69	14.47	12.12	7.55	13.22	10.83	10.66	.88	13.76	12.08
CAI	18.72	9.72	17.34	15.44	17.70	9.46	17.55	19.13	20.33	3.55	16.76	11.20
CEA	16.08	9.75	17.21	16.17	17.82	7.24	18.00	2.66	17.00		16.60	9.91
CN	12.72	17.40	12.34	13.70	16.07	21.81	14.11	23.87	15.00	2.66	15.51	23.27
CQ	17.24	24.58	17.78	21.12	16.55	16.89	15.66	21.33	17.66	9.55	16.27	15.50
CI	15.36	24.63	15.47	24.33	13.57	22.14	14.55	6.91	15.33	11.55	14.69	25.42
CP	14.60	13.28	14.30	15.42	13.72	17.39	15.66	31.77	12.00	8.66	13.34	18.92
ML	14.08	19.51	13.00	12.95	13.35	12.72	13.66	13.77	11.00	4.66	13.55	18.24
MR	17.60	20.24	18.04	14.73	19.07	11.51	18.11	11.87	19.66	10.88	18.55	15.64
MI	15.72	14.68	15.60	13.10	14.27	17.29	14.11	8.32	13.66	6.22	14.76	13.85
MD	12.56	18.40	13.34	19.09	13.30	16.16	12.44	17.13	15.66	6.22	12.86	20.25
E	25.92	185.43	27.43	115.98	35.77	183.22	27.44	71.80	37.33	77.55	39.74	187.44

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - INSTRUCTOR 03 - N=39

SCALE	N=9		N=3		N=23		N=0		N=0		N=4	
	GRADE A		GRADE B		GRADE C		GRADE D		GRADE F		GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	16.88	7.87	17.00	2.00	16.21	7.73					19.25	3.68
CSO	11.22	7.06	9.66	4.22	11.47	5.64					12.25	5.18
CAG	13.22	14.83	14.66	6.88	13.39	10.32					10.00	6.50
CEC	18.66	11.11	18.66	.22	18.43	7.02					18.50	13.25
CAT	14.33	10.88	14.33	21.55	12.82	12.75					12.00	8.50
CSD	13.44	11.58	13.66	16.22	14.13	11.59					13.25	2.18
CAI	16.00	24.22	12.33	2.88	15.34	18.14					15.00	9.50
CEA	16.22	9.95	19.66	4.22	17.26	19.67					19.75	21.18
CN	13.66	20.88	15.33	24.88	15.73	25.14					20.75	12.18
CQ	15.77	21.50	19.00	2.00	16.78	12.08					15.50	37.25
CI	16.33	23.11	6.66	.88	13.52	11.55					12.75	17.18
CP	13.88	14.09	15.66	9.55	13.08	18.42					11.00	10.00
ML	13.77	13.28	15.66	20.22	13.91	13.03					15.50	9.25
MR	17.44	21.13	19.33	43.55	19.95	16.65					18.00	14.50
MI	16.66	20.00	16.66	8.22	13.73	14.71					16.25	21.68
MD	12.11	19.20	8.33	1.55	11.47	9.81					10.25	5.68
E	33.44	272.02	46.66	104.22	39.04	213.69					46.25	523.18

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - INSTRUCTOR 04 - N=104

SCALE	N=17		N=17		N=53		N=3		N=4		N=10	
	GRADE A		GRADE B		GRADE C		GRADE D		GRADE F		GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	16.52	6.01	15.94	4.64	15.52	10.85	15.00	8.00	15.50	10.25	16.90	10.09
CSO	12.23	8.29	11.82	7.20	11.58	8.77	11.33	6.22	11.75	10.68	11.20	10.56
CAG	13.58	13.88	13.47	10.01	14.64	6.49	14.33	2.88	12.25	6.18	13.00	2.60
CEC	17.64	9.87	18.76	11.59	18.24	8.18	19.33	2.88	20.50	2.25	18.00	12.00
CAT	13.76	14.06	12.88	11.16	13.50	18.36	10.00	14.00	17.50	5.25	13.50	11.25
CSD	14.05	12.05	12.76	10.88	13.52	8.81	14.00	2.00	12.50	13.25	12.90	18.29
CAI	15.52	20.95	15.82	8.14	16.09	10.04	16.33	1.55	12.25	3.18	15.30	7.41
CEA	16.64	12.58	18.52	10.36	16.83	11.38	19.66	11.55	17.75	3.68	18.30	10.21
CN	14.29	16.20	16.17	18.02	17.43	22.73	20.66	6.88	19.25	12.68	17.10	23.89
CQ	19.00	13.64	16.82	17.91	15.94	13.86	12.66	8.22	20.50	16.75	15.20	12.36
CI	11.94	20.64	12.05	27.46	13.58	14.80	16.00	.66	10.25	1.18	13.20	15.76
CP	14.76	14.06	14.17	18.96	13.03	19.92	10.66	.22	9.75	8.18	14.20	16.36
ML	14.29	11.14	15.88	10.22	14.32	13.80	12.66	17.55	13.00	38.00	15.60	7.44
MR	19.41	10.71	18.58	11.18	18.20	16.88	22.00	.66	19.50	4.25	18.90	18.09
MI	13.58	13.30	13.58	15.18	13.71	18.05	13.66	8.22	15.50	10.75	14.20	9.16
MD	12.70	12.67	11.94	11.23	13.75	25.12	11.66	16.22	12.00	21.50	11.20	14.76
E	32.47	292.36	35.94	83.70	39.64	256.04	45.00	74.00	51.50	172.25	38.60	282.84

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - INSTRUCTOR 05 - N=93

SCALE	N=9		N=26		N=29		N=11		N=2		N=16	
	GRADE A		GRADE B		GRADE C		GRADE D		GRADE F		GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	15.88	9.43	16.46	11.47	16.44	12.04	17.18	6.51	16.50	2.25	15.87	10.60
CSO	9.22	2.17	10.65	3.84	10.48	9.76	12.90	6.80	11.00	4.00	12.56	11.12
CAG	16.55	5.58	15.00	8.30	14.62	10.23	13.18	11.96	11.00	4.00	13.75	6.31
CEC	18.33	9.55	17.88	8.79	18.10	7.61	16.72	6.01	21.50	2.25	17.81	8.02
CAT	14.44	11.35	13.30	9.98	13.48	11.62	11.63	8.95	10.00	1.00	13.81	20.90
CSD	12.55	7.80	12.88	15.25	13.86	9.70	14.27	3.65	14.50	6.25	14.00	8.00
CAI	17.33	10.88	17.76	13.56	17.44	8.86	17.90	8.08	15.00		15.81	16.77
CEA	15.66	9.77	16.03	14.11	15.13	9.98	16.18	2.69	20.50	2.25	16.37	17.98
CN	13.88	29.87	13.84	24.59	16.82	17.66	17.09	12.99	22.50	.25	14.25	11.56
CQ	16.00	19.55	15.69	18.36	15.75	22.18	13.63	6.23	10.50	6.25	16.93	28.18
CI	15.33	18.22	16.03	12.80	15.20	27.95	14.72	20.01	18.00		14.18	24.40
CP	14.77	18.61	14.42	26.70	12.20	16.78	14.54	12.61	9.00	4.00	14.62	19.48
ML	13.55	8.02	13.38	11.69	13.62	9.13	11.90	30.26	18.50	6.25	13.62	15.10
MR	16.44	14.46	17.50	26.63	18.68	16.55	19.27	13.47	16.50	30.25	18.50	15.25
MI	16.22	24.83	16.11	15.25	14.31	11.38	13.27	14.74	16.00	4.00	16.43	12.87
MD	13.77	21.28	13.00	25.23	13.37	25.13	15.54	28.06	9.00	1.00	11.43	14.62
E	17.44	97.80	31.38	362.69	36.20	242.23	34.45	231.70	22.50	12.25	30.56	270.24

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - INSTRUCTOR 06 - N=79

SCALE	N=14 GRADE A		N=20 GRADE B		N=24 GRADE C		N=8 GRADE D		N=2 GRADE F		N=11 GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	15.21	12.45	17.55	15.74	15.70	12.79	15.62	8.23	14.00	1.00	18.18	7.60
CSO	9.35	3.65	10.35	8.92	11.00	10.58	11.12	10.35	12.00	4.00	11.18	8.69
CAG	16.21	12.02	14.60	11.74	15.25	7.18	14.37	5.73	16.50	2.25	12.18	14.14
CEC	19.21	7.88	17.35	4.62	17.79	5.41	18.87	2.60	17.50	2.25	18.45	9.15
CAT	12.78	11.59	13.50	13.05	12.12	16.10	12.50	6.50	11.50	2.25	15.09	18.81
CSD	11.92	22.63	11.30	4.91	13.33	10.80	12.62	6.23	11.50	12.25	12.27	7.65
CAI	18.57	17.24	17.15	13.92	17.16	10.97	16.87	5.10	18.00	4.00	15.36	24.59
CEA	16.00	14.71	17.90	10.19	17.33	7.97	18.00	9.50	19.00		17.27	8.38
CN	9.35	11.65	12.85	24.92	15.87	19.35	14.37	7.73	11.00	4.00	14.45	16.61
CQ	16.78	24.45	15.65	18.42	14.95	20.37	19.12	18.10	14.50	30.25	17.90	14.08
CI	17.00	10.00	16.45	24.54	16.50	22.66	12.12	15.10	18.50	.25	14.09	15.90
CP	16.85	7.26	15.05	22.24	12.66	16.97	14.37	12.48	16.00	16.00	13.54	17.33
ML	13.50	16.10	13.95	14.64	14.00	21.25	14.75	7.18	11.50	.25	13.45	16.06
MR	15.42	21.95	18.45	18.24	16.95	16.95	18.75	14.93	16.00	16.00	16.54	10.97
MI	17.00	18.57	14.80	17.56	15.29	15.87	13.50	11.00	18.00	1.00	17.54	13.88
MD	14.07	17.63	12.85	15.72	13.75	16.35	13.00	11.00	14.50	6.25	12.45	11.33
E	17.71	108.34	26.15	144.12	34.62	263.98	41.37	125.73	44.50	2.25	28.63	116.23

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - SUB-GROUP I - N=86

SCALE	N=12 GRADE A MEAN	N=12 GRADE A VAR	N=5 GRADE B MEAN	N=5 GRADE B VAR	N=64 GRADE C MEAN	N=64 GRADE C VAR	N=0 GRADE D MEAN	N=0 GRADE D VAR	N=0 GRADE F MEAN	N=0 GRADE F VAR	N=5 GRADE W MEAN	N=5 GRADE W VAR
CAP	17.16	10.30	19.60	4.64	15.67	11.47					18.80	1.36
CSO	9.75	2.68	11.80	11.36	11.57	8.24					10.60	3.84
CAG	14.25	7.85	11.20	5.76	14.56	7.33					11.20	4.56
CEC	18.83	10.13	16.80	5.36	17.70	7.45					19.40	8.24
CAT	13.00	10.33	15.20	.56	13.32	15.03					13.00	13.60
CSD	11.91	7.07	11.20	2.56	13.32	7.47					14.60	8.24
CAI	18.58	9.07	12.80	8.56	16.32	10.59					14.20	6.16
CEA	16.50	14.58	20.20	3.76	16.81	11.43					18.20	16.96
CN	14.25	22.35	14.60	20.64	17.31	23.02					20.40	32.64
CQ	16.75	35.02	14.20	17.36	15.09	15.52					12.00	9.20
CI	14.91	28.74	17.40	8.64	15.03	19.03					16.80	1.76
CP	13.83	8.47	13.80	10.56	12.25	13.71					10.80	10.56
ML	13.75	15.18	15.20	7.76	14.14	16.90					15.20	6.16
MR	18.50	14.75	16.00	14.40	17.14	16.96					18.60	13.04
MI	15.50	13.08	15.80	26.56	14.01	15.82					17.20	11.36
MD	12.25	16.52	13.20	12.96	14.37	15.67					9.00	4.80
E	27.16	172.63	40.40	102.64	41.95	248.26					42.80	305.36

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - SUB-GROUP II - N=219

SCALE	N=32 GRADE A		N=37 GRADE B		N=80 GRADE C		N=17 GRADE D		N=13 GRADE F		N=40 GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	16.75	10.12	15.72	7.92	15.77	9.92	16.52	8.83	15.76	9.56	17.47	8.89
CSO	11.56	8.93	11.10	5.98	11.52	8.32	13.29	8.79	10.15	8.59	11.05	8.54
CAG	14.06	14.43	14.32	10.05	14.42	8.71	13.11	8.33	13.53	10.09	12.77	7.97
CEC	17.62	8.48	18.72	8.90	18.23	8.65	17.05	7.46	19.76	6.33	18.12	9.50
CAT	14.34	12.53	12.89	11.98	12.73	15.06	10.76	9.35	14.00	13.69	13.60	13.69
CSD	13.28	13.32	13.37	14.83	13.72	12.47	13.35	7.87	11.76	10.17	12.90	10.04
CAI	16.03	19.34	16.27	13.11	16.46	10.62	18.35	7.16	16.69	14.98	15.87	12.55
CEA	16.34	11.47	17.45	10.24	17.05	13.79	17.11	7.28	17.53	6.55	17.62	14.13
CN	13.81	20.40	16.21	21.46	16.86	21.36	16.76	19.47	17.15	20.89	16.35	26.87
CQ	16.68	17.15	16.59	20.61	16.35	15.60	14.58	13.18	17.84	22.59	16.62	17.43
CI	15.09	28.39	13.67	32.00	13.53	19.27	15.00	17.05	13.92	14.99	12.97	24.22
CP	14.40	16.17	12.83	18.29	13.25	20.88	13.64	17.28	11.00	8.61	13.87	17.20
ML	14.59	16.49	14.40	11.64	13.70	14.13	13.05	28.76	13.76	26.02	14.00	11.30
MR	17.81	16.15	18.72	18.19	19.01	16.18	19.29	10.44	18.30	17.90	19.27	12.74
MI	14.50	22.50	14.43	14.67	13.95	16.19	13.23	9.94	14.53	6.24	14.15	15.32
MD	13.12	16.10	12.43	16.56	13.26	25.99	14.41	23.30	13.38	22.85	12.42	11.14
E	30.65	303.41	39.78	178.33	36.48	215.59	36.76	186.18	40.69	219.13	41.32	283.06

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - SUB-GROUP III - N=188

SCALE	N=20		N=40		N=35		N=19		N=5		N=69	
	GRADE A		GRADE B		GRADE C		GRADE D		GRADE F		GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	15.25	10.58	17.40	9.74	15.25	10.99	16.78	4.48	17.20	12.16	16.53	12.59
CSO	9.50	3.55	9.62	7.43	9.74	6.41	11.00	9.26	10.20	5.36	11.50	8.56
CAG	16.65	10.42	15.60	9.49	15.60	5.95	14.05	8.04	14.80	5.36	13.53	10.77
CEC	17.95	9.14	17.32	8.86	19.00	6.28	17.47	13.82	17.80	3.76	18.02	6.89
CAT	12.70	8.71	13.37	9.08	12.05	11.48	11.15	5.92	11.60	1.84	13.01	18.65
CSD	12.90	13.49	12.10	12.09	12.85	11.83	13.57	9.50	13.00	9.20	13.59	11.51
CAI	18.90	11.19	18.82	13.34	17.77	11.89	16.94	10.89	18.20	8.16	16.62	15.45
CEA	15.45	6.54	15.67	19.36	16.82	9.68	17.78	5.95	17.20	10.56	16.76	11.74
CN	11.75	14.38	11.72	10.89	13.71	17.57	13.84	17.50	13.00	8.00	14.91	21.23
CQ	18.60	18.54	16.62	19.03	17.11	17.47	17.68	20.84	16.20	20.96	16.57	18.12
CI	14.75	18.08	15.80	17.61	13.77	18.91	13.21	12.48	17.40	17.44	14.84	25.00
CP	14.80	12.76	15.85	18.62	15.25	16.64	15.26	25.56	13.40	14.64	13.62	20.46
ML	13.25	9.98	12.72	16.54	12.34	10.33	14.42	9.92	12.80	7.76	13.40	17.05
MR	17.85	28.22	17.02	17.87	19.02	16.48	18.63	14.54	16.80	19.76	17.85	18.35
MI	16.25	12.88	16.75	11.73	15.80	16.96	13.47	12.03	16.40	3.04	16.04	15.46
MD	12.55	17.04	13.50	23.65	12.82	14.94	12.68	18.21	14.00	13.20	12.43	21.46
E	22.35	168.02	20.57	83.99	26.94	121.08	31.57	169.08	32.20	218.56	34.57	25.05

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - SUB-GROUP IV - N=49

SCALE	N=12 GRADE A MEAN	 VAR	N=11 GRADE B MEAN	 VAR	N=8 GRADE C MEAN	 VAR	N=4 GRADE D MEAN	 VAR	N=1 GRADE F MEAN	 VAR	N=13 GRADE W MEAN	 VAR
CAP	16.50	16.25	16.18	9.96	14.75	7.18	14.00	5.00	8.00		17.38	13.77
CSO	9.75	6.02	11.54	6.06	9.62	11.23	11.50	7.25	11.00		11.23	7.87
CAG	15.91	9.57	14.36	10.23	16.37	11.98	16.25	5.68	19.00		12.53	6.40
CEC	17.83	11.47	17.90	7.53	18.00	3.50	18.25	17.18	22.00		18.84	3.51
CAT	14.75	15.02	13.81	17.42	12.75	4.93	11.25	6.68	10.00		14.53	23.01
CSD	14.50	8.41	12.90	11.53	12.87	9.85	17.50	4.75	10.00		11.61	12.39
CAI	16.66	13.55	17.81	3.96	17.37	15.48	16.00	1.50	19.00		16.92	9.14
CEA	14.08	14.24	15.45	22.61	17.00	12.25	15.25	6.68	21.00		16.92	8.53
CN	10.25	10.68	10.63	5.86	11.87	12.10	14.25	3.68	8.00		13.23	17.25
CQ	17.83	12.13	19.36	15.68	19.50	21.25	15.25	5.18	23.00		16.84	13.97
CI	14.66	12.22	12.72	8.19	13.12	7.60	13.75	7.68	13.00		13.92	14.07
CP	17.25	15.35	17.27	12.56	15.50	11.25	16.75	5.18	16.00		16.00	18.00
ML	13.08	21.90	13.72	10.19	12.62	7.73	13.25	8.68	8.00		13.69	10.36
MR	15.33	12.55	16.36	25.50	16.50	20.75	21.50	2.75	24.00		18.15	16.13
MI	18.91	16.07	16.90	15.90	17.50	9.25	14.00	6.50	14.00		16.00	22.92
MD	12.66	24.88	13.00	10.18	13.37	16.73	11.25	15.18	14.00		12.15	8.13
E	16.33	83.72	21.18	96.14	29.00	171.00	27.75	39.18	36.00		25.30	131.59

LEARNING STYLES INVENTORY

MEANS AND VARIANCES - SUB-GROUP V - N=29

SCALE	N=10		N=11		N=6		N=1		N=0		N=1	
	GRADE A		GRADE B		GRADE C		GRADE D		GRADE F		GRADE W	
	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR	MEAN	VAR
CAP	14.70	9.01	17.09	19.90	16.66	9.55	13.00				18.00	
CSO	9.40	3.24	10.90	9.71	11.50	11.91	9.00				8.00	
CAG	17.60	7.84	14.90	11.90	13.66	8.22	17.00				15.00	
CEC	18.30	7.81	17.09	4.62	18.16	1.80	21.00				19.00	
CAT	12.80	9.96	13.63	21.50	11.50	30.25	14.00				13.00	
CSD	10.30	11.61	11.54	7.15	13.16	6.47	11.00				12.00	
CAI	19.20	19.56	17.00	8.18	18.33	17.88	21.00				23.00	
CEA	16.70	12.01	17.81	14.14	17.00	2.33	14.00				12.00	
CN	9.60	14.04	11.54	24.24	13.00	7.33	16.00				18.00	
CQ	15.80	25.76	17.18	12.33	18.50	7.58	13.00				13.00	
CI	17.20	12.56	15.45	31.15	16.83	22.80	19.00				21.00	
CP	17.40	5.64	15.81	25.05	11.66	28.55	12.00				8.00	
ML	12.90	16.89	13.81	16.87	13.66	11.88	9.00				7.00	
MR	16.30	13.01	19.27	18.74	18.83	12.13	22.00				17.00	
MI	17.10	17.29	14.00	21.63	16.66	17.88	13.00				16.00	
MD	13.70	19.21	12.90	15.17	10.83	9.47	16.00				20.00	
E	15.50	51.05	23.18	155.05	30.33	45.22	42.00				24.00	

APPENDIX IX

"t" AND F STATISTICS FOR THE LEARNING STYLES INVENTORY

LEARNING STYLES INVENTORY

t AND F STATISTICS - TOTAL GROUP

SCALE	t STATISTICS						F STATISTICS					
CAP		B	C	D	F	W		B	C	D	F	W
	A	1.15	1.29	.21	.51	1.75*	A	1.07	1.11	1.62*	1.20	1.03
	B		2.80*	.74	1.20	.60	B		1.03	1.51	1.28	1.04
	C			1.25	.13	3.66*	C			1.46	1.33	1.08
	D				.68	1.20	D				1.92*	1.56
	F					1.51	F					1.24
CSO		B	C	D	F	W		B	C	D	F	W
	A	.68	2.20*	3.05*	.17	2.44*	A	1.18	1.30	1.54*	1.15	1.25
	B		1.53	2.51*	.55	1.79*	B		1.11	1.30	1.02	1.06
	C			1.57	1.31	.40	C			1.16	1.14	1.04
	D				2.03*	1.27	D				1.33	1.22
	F					1.49	F					1.10
CAG		B	C	D	F	W		B	C	D	F	W
	A	1.25	1.53	2.16*	1.33	4.86*	A	1.20	1.59*	1.46	1.25	1.37
	B		.03	1.31	.70	3.84*	B		1.32*	1.21	1.04	1.14
	C			1.59	.83	4.81*	C			1.09	1.27	1.15
	D				.24	1.52	D				1.16	1.06
	F					1.36	F					1.10
CEC		B	C	D	F	W		B	C	D	F	W
	A	.32	.56	.84	1.83*	.56	A	1.09	1.24	1.25	1.39	1.26
	B		1.02	.65	2.12*	.98	B		1.14	1.37	1.28	1.15
	C			1.45	1.79*	.05	C			1.56*	1.12	1.01
	D				2.14*	1.41	D				1.75	1.58*
	F					1.74	F					1.11
CAT		B	C	D	F	W		B	C	D	F	W
	A	.56	1.81*	4.14*	.56	.55	A	1.01	1.20	1.58	1.01	1.43*
	B		1.31	3.75*	.24	.03	B		1.20	1.59*	1.01	1.43*
	C			2.68*	.42	1.28	C			1.91*	1.22	1.19
	D				2.49*	3.26*	D				1.56	2.27*
	F					.19	F					1.45
CSD		B	C	D	F	W		B	C	D	F	W
	A	.55	1.28	1.48	.92	.78	A	1.03	1.24	1.31	1.25	1.14
	B		2.07*	1.99*	.61	1.45	B		1.20	1.27	1.21	1.11
	C			.76	1.77*	.48	C			1.06	1.01	1.09
	D				2.04*	1.01	D				1.04	1.15
	F					1.45	F					1.10

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - TOTAL GROUP

SCALE		t STATISTICS						F STATISTICS				
		B	C	D	F	W		B	C	D	F	W
CAI	A	.32	1.60	.03	.29	2.07*	A	1.24	1.48*	1.85*	1.26	1.22
	B		1.34	.32	.13	1.92*	B		1.19	1.49	1.01	1.02
	C			1.36	.55	.93	C			1.25	1.18	1.22
	D				.36	1.79*	D				1.47	1.52
	F					.90	F					1.03
CEA	A	1.52	2.33*	2.09*	2.04*	2.41*	A	1.39	1.01	1.63	1.44	1.06
	B		.44	.63	.92	.67	B		1.41	2.27*	2.01*	1.32
	C			.42	.86	.36	C			1.61*	1.43	1.08
	D				.60	.17	D				1.14	1.72*
	F					.65	F					1.54
CN	A	1.38	6.04*	3.24*	2.73*	4.51*	A	1.05	1.15	1.07	1.19	1.23
	B		4.82*	2.17*	1.93*	3.30*	B		1.09	1.12	1.14	1.18
	C			1.18	.46	1.23	C			1.23	1.03	1.08
	D				.34	.33	D				1.27	1.32
	F					.12	F					1.03
CQ	A	.53	1.67*	1.34	.41	1.28	A	1.09	1.25	1.16	1.14	1.19
	B		1.12	.98	.74	.76	B		1.15	1.07	1.23	1.09
	C			.31	1.40	.30	C			1.08	1.41	1.05
	D				1.31	.48	D				1.32	1.03
	F					1.19	F					1.35
CI	A	.58	1.72*	1.20	.32	1.31	A	1.09	1.16	1.49	1.25	1.05
	B		1.07	.71	.02	.72	B		1.26	1.61	1.35	1.02
	C			.02	.59	.24	C			1.28	1.07	1.23
	D				.58	.17	D				1.19	1.56
	F					.42	F					1.32
CP	A	.54	3.36*	.65	3.40*	2.33*	A	1.41*	1.28	1.43	1.19	1.35
	B		2.78*	.20	2.65*	1.74*	B		1.10	1.01	1.69	1.05
	C			1.76*	1.39	.92	C			1.11	1.53	1.05
	D				2.32*	1.08	D				1.71	1.07
	F					1.77*	F					1.61

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - TOTAL GROUP

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.16	.40	.19	.52	.21	A	1.12	1.12	1.15	1.39	1.11
	B		.24	.07	.46	.05	B		1.00	1.30	1.56	1.01
	C			.08	.37	.20	C			1.30	1.56	1.01
	D				.32	.04	D				1.20	1.28
	F					.44	F					1.55
MR		B	C	D	F	W		B	C	D	F	W
	A	.55	1.62	2.39*	.73	1.63	A	1.05	1.09	1.53	1.09	1.15
	B		1.02	1.94*	.41	1.07	B		1.14	1.60*	1.04	1.21
	C			1.40	.07	.14	C			1.40	1.19	1.06
	D				.98	1.29	D				1.67	1.33
	F					.14	F					1.26
MI		B	C	D	F	W		B	C	D	F	W
	A	.58	2.60*	3.27*	.91	.80	A	1.20	1.16	1.87*	3.26*	1.18
	B		2.13*	3.08*	.63	.21	B		1.03	1.56	2.71*	1.02
	C			1.64	.48	2.03*	C			1.61*	2.80*	1.01
	D				1.88*	2.95*	D				1.74	1.59
	F					.51	F					2.78*
MD		B	C	D	F	W		B	C	D	F	W
	A	.19	1.06	.56	.64	.93	A	1.02	1.11	1.16	1.10	1.07
	B		.91	.43	.54	1.19	B		1.09	1.15	1.09	1.09
	C			.18	.09	2.32*	C			1.05	1.00	1.19
	D				.19	1.33	D				1.06	1.25
	F					1.22	F					1.18
E		B	C	D	F	W		B	C	D	F	W
	A	1.95*	5.86*	3.30*	3.56*	5.23*	A	1.08	1.01	1.32	1.01	1.14
	B		4.02*	1.87*	2.59*	3.56*	B		1.09	1.23	1.09	1.22
	C			.96	.58	.05	C			1.33	1.00	1.12
	D				1.19	.85	D				1.33	1.49
	F					.56	F					1.12

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 01

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	.28	1.01	.40	.04	1.13	A	1.39	2.94*	2.12	1.43	1.77
	B		1.59	.77	.19	.86	B		2.11	1.52	2.00	1.27
	C			.49	.90	3.17*	C			1.39	4.17*	1.67
	D				.38	1.73*	D				3.03	1.20
	F					.87	F					2.54*
CSO		B	C	D	F	W		B	C	D	F	W
	A	.50	1.07	1.12	.26	.75	A	1.49	1.41	2.08	1.13	1.04
	B		.53	.69	.67	.10	B		1.06	1.41	1.68	1.42
	C			.33	1.17	.65	C			1.47	1.59	1.35
	D				1.18	.87	D				2.35	1.99
	F					.93	F					1.18
CAG		B	C	D	F	W		B	C	D	F	W
	A	.53	1.22	1.45	1.60	2.88*	A	1.15	1.07	1.84	1.02	1.01
	B		.62	.87	1.12	2.38*	B		1.22	2.10	1.17	1.16
	C			.38	.77	2.05*	C			1.72	1.05	1.05
	D				.43	1.14	D				1.79	1.82
	F					.54	F					1.01
CEC		B	C	D	F	W		B	C	D	F	W
	A	.33	1.25	.68	.88	1.22	A	1.00	1.17	1.10	1.05	1.87
	B		1.74*	1.02	1.20	1.83*	B		1.18	1.09	1.04	1.88
	C			.33	.03	.50	C			1.28	1.23	1.59
	D				.22	.06	D				1.04	2.04
	F					.30	F					1.96
CAT		B	C	D	F	W		B	C	D	F	W
	A	.30	1.75*	2.55*	.90	.60	A	1.32	1.32	3.16*	1.51	1.19
	B		2.35*	3.25*	1.31	1.02	B		1.00	2.40	1.14	1.56
	C			1.14	.53	1.38	C			2.40	1.14	1.59
	D				1.62	1.95*	D				2.08	3.85*
	F					.42	F					1.79
CSD		B	C	D	F	W		B	C	D	F	W
	A	.67	.06	.50	1.30	1.05	A	1.10	1.19	1.54	1.23	1.17
	B		.82	1.10	.70	.20	B		1.08	1.39	1.35	1.29
	C			.50	1.39	1.38	C			1.28	1.46	1.39
	D				1.55	1.63	D				1.88	1.79
	F					.71	F					1.05

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 01

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	1.25	.88	.12	.64	.81	A	1.96	1.30	2.51	1.99	1.08
	B		2.59*	1.33	.48	2.47*	B		1.52	1.28	1.02	1.82
	C			1.06	1.60	.12	C			1.94	1.54	1.20
	D				.70	.94	D				1.27	2.33
	F					1.46	F					1.85
CEA		B	C	D	F	W		B	C	D	F	W
	A	.75	2.23*	1.38	1.55	2.59*	A	1.54	1.16	1.41	1.20	1.06
	B		3.09*	1.96*	2.04*	3.68*	B		1.32	2.17	1.29	1.44
	C			.73	.21	.13	C			1.64	1.03	1.09
	D				.41	.89	D				1.69	1.52
	F					.32	F					1.12
CN		B	C	D	F	W		B	C	D	F	W
	A	.30	1.59	1.54	1.60	2.70*	A	1.70	1.89	1.16	1.69	2.70*
	B		1.56	1.57	1.68	2.82*	B		3.23*	2.00	2.86*	4.55*
	C			.06	.20	1.61	C			1.62	1.12	1.43
	D				.25	1.22	D				1.45	2.33
	F					.85	F					1.61
CQ		B	C	D	F	W		B	C	D	F	W
	A	1.02	.70	.37	1.06	.50	A	1.12	1.04	1.26	1.05	1.05
	B		.49	.62	.15	1.86*	B		1.17	1.42	1.18	1.07
	C			.25	.58	1.60	C			1.22	1.01	1.09
	D				.74	.91	D				1.20	1.32
	F					1.65*	F					1.10
CI		B	C	D	F	W		B	C	D	F	W
	A	1.46	2.19*	1.12	.55	1.16	A	1.09	1.74	1.07	1.19	1.41
	B		.38	.20	.66	.34	B		1.59	1.02	1.32	1.54
	C			.58	1.14	.81	C			1.61	2.08	2.44*
	D				.44	.09	D				1.28	1.52
	F					.39	F					1.18
CP		B	C	D	F	W		B	C	D	F	W
	A	.26	.41	.42	2.02*	1.34	A	1.11	1.10	1.49	2.62	1.14
	B		.77	.68	2.41*	1.80*	B		1.01	1.67	2.37	1.27
	C			.14	1.83*	1.22	C			1.64	2.38	1.25
	D				1.27	.69	D				3.93*	1.31
	F					.88	F					3.03*

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 01

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.52	.97	1.08	.23	.34	A	1.62	1.77	1.73	1.10	2.16*
	B		.43	1.88*	.76	1.24	B		1.09	1.07	1.47	1.34
	C			2.48*	1.19	2.07*	C			1.02	1.59	1.22
	D				.78	1.37	D				1.56	1.25
	F					.07	F					1.96
MR		B	C	D	F	W		B	C	D	F	W
	A	.98	.44	1.83*	.44	1.00	A	1.08	1.41	1.75	1.82	1.14
	B		.56	2.85*	1.22	2.30*	B		1.32	1.87	1.69	1.06
	C			2.16*	.81	1.84*	C			2.45	1.28	1.23
	D				.95	1.01	D				3.13	2.00
	F					.27	F					1.59
MI		B	C	D	F	W		B	C	D	F	W
	A	.03	.55	2.90*	2.04*	1.54	A	1.66	1.57	3.28*	22.99*	1.16
	B		.61	3.59*	2.58*	1.74*	B		1.05	1.98	13.85*	1.43
	C			3.11*	1.98*	1.36	C			2.08	14.60*	1.35
	D				1.41	1.82	D				7.01*	2.86*
	F					.80	F					20.00*
MD		B	C	D	F	W		B	C	D	F	W
	A	1.56	1.73*	.13	1.04	.22	A	1.59	1.14	1.07	1.15	1.28
	B		.17	1.37	.13	1.84*	B		1.41	1.49	1.85	1.25
	C			1.50	.25	2.28*	C			1.06	1.32	1.13
	D				.90	.03	D				1.23	1.19
	F					1.21	F					1.48
E		B	C	D	F	W		B	C	D	F	W
	A	.25	2.67*	2.46*	2.83*	3.45*	A	1.50	1.17	1.13	1.92	2.08
	B		2.77*	2.65*	3.11*	3.67*	B		1.28	1.33	2.86*	3.13*
	C			.37	1.42	1.96*	C			1.03	2.22	2.44*
	D				.88	1.06	D				2.17	2.38
	F					.05	F					1.09

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 02

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	.68	1.32	.66	.46	.14	A	1.46	1.26	6.45*	10.62	1.11
	B		2.18*	.16	.93	.63	B		1.16	4.41*	7.26	1.32
	C			1.78*	.08	1.72*	C			5.14*	8.46	1.12
	D				1.99*	.60	D				1.65	5.88*
	F					.55	F					10.00
CSO		B	C	D	F	W		B	C	D	F	W
	A	.25	1.70*	2.45*	1.34	2.50*	A	2.00*	1.59	2.27	1.74	1.49
	B		1.21	1.77*	1.06	1.89*	B		1.26	1.12	3.50	1.34
	C			1.21	1.77*	.78	C			1.41	2.77	1.06
	D				2.06*	.79	D				3.92	1.50
	F					2.12*	F					2.63
CAG		B	C	D	F	W		B	C	D	F	W
	A	1.11	.93	1.75*	.74	3.50*	A	1.08	1.79*	1.19	8.39*	1.20
	B		.55	.89	1.24	2.04*	B		1.93*	1.10	9.06*	1.30
	C			1.63*	1.45	3.42*	C			2.13	4.70*	1.49
	D				1.72	.40	D				9.96*	1.42
	F					2.37	F					7.14
CEC		B	C	D	F	W		B	C	D	F	W
	A	.67	.72	1.46	1.19	.95	A	1.16	1.01	3.23*	22.73*	1.06
	B		.08	1.77*	.79	.13	B		1.17	2.78*	26.29*	1.23
	C			2.07*	.90	.25	C			3.33*	22.41*	1.05
	D				1.31	2.25*	D				73.52*	3.43*
	F					.82	F					20.00
CAT		B	C	D	F	W		B	C	D	F	W
	A	.56	1.29	2.83*	.69	.46	A	1.32	1.27	2.21	2.41	1.61
	B		.61	2.07*	.35	.12	B		1.04	2.90	3.16	1.22
	C			1.70*	.09	.84	C			2.80	3.05	1.27
	D				1.37	2.03*	D				1.09	3.57*
	F					.37	F					3.85
CSD		B	C	D	F	W		B	C	D	F	W
	A	.83	.34	1.14	.72	2.28*	A	1.85	1.05	1.49	6.08	1.52
	B		.68	.35	.88	1.14	B		1.95*	1.24	11.35	1.22
	C			1.02	.89	2.35*	C			1.56	5.81	1.59
	D				1.21	.42	D				9.14	1.01
	F					1.51	F					9.09

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 02

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	1.32	1.27	.83	.85	2.34*	A	1.59	1.04	2.13	1.90	1.14
	B		.39	.13	1.25	.62	B		1.66	1.33	3.03	1.41
	C			.11	1.43	1.30	C			2.22*	1.82	1.18
	D				.97	.59	D				4.04	1.88
	F					1.79*	F					2.13
CEA		B	C	D	F	W		B	C	D	F	W
	A	1.08	2.35*	1.71*	.49	.65	A	1.67	1.37	3.39*		1.00
	B		.70	.55	.09	.67	B		2.28*	5.63*		1.67
	C			.18	.52	1.87*	C			2.48		1.37
	D				.97	1.27	D					3.33
	F					.21	F					
CN		B	C	D	F	W		B	C	D	F	W
	A	.32	2.89*	.79	.90	2.38*	A	1.27	1.23	1.49	4.53	1.32
	B		3.23*	1.07	1.18	2.70*	B		1.56	1.89	3.58	1.67
	C			1.11	.39	.53	C			1.20	5.59	1.06
	D				.28	.77	D				6.72	1.13
	F					.18	F					5.88
CQ		B	C	D	F	W		B	C	D	F	W
	A	.38	.60	.81	.14	.87	A	1.16	1.48	1.07	1.79	1.61
	B		1.08	1.13	.04	1.37	B		1.27	1.09	1.54	1.39
	C			.56	.45	.30	C			1.39	1.21	1.09
	D				.64	.40	D				1.67	1.51
	F					.58	F					1.11
CI		B	C	D	F	W		B	C	D	F	W
	A	.08	1.43	.45	.01	.52	A	1.01	1.13	3.30*	1.48	1.01
	B		1.49	.52	.05	.59	B		1.12	3.27*	1.47	1.02
	C			.59	.62	1.03	C			2.92	1.31	1.15
	D				.37	.08	D				2.22	3.33*
	F					.21	F					1.49
CP		B	C	D	F	W		B	C	D	F	W
	A	.26	.85	.62	1.15	1.19	A	1.16	1.28	2.56*	1.06	1.41
	B		.53	.75	.94	.87	B		1.11	2.22	1.24	1.20
	C			1.15	.69	.40	C			2.00	1.37	1.09
	D				.98	1.35	D				2.75	1.85
	F					.52	F					1.49

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 02

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.90	.72	.24	1.15	.47	A	1.50	1.56	1.31	2.90	1.09
	B		.37	.45	.90	.53	B		1.04	1.15	1.94	1.37
	C			.23	1.10	.24	C			1.19	1.86	1.43
	D				1.08	.07	D				2.21	1.20
	F					1.01	F					2.70
MR		B	C	D	F	W		B	C	D	F	W
	A	.36	1.48	.30	.74	.90	A	1.37	1.78	1.58	1.29	1.32
	B		1.09	.04	.67	.50	B		1.30	1.15	1.06	1.04
	C			.75	.28	.63	C			1.14	1.39	1.35
	D				.62	.31	D				1.22	1.20
	F					.46	F					1.02
MI		B	C	D	F	W		B	C	D	F	W
	A	.10	1.38	1.11	.87	.99	A	1.12	1.16	1.63	1.64	1.08
	B		1.26	1.08	.87	.87	B		1.30	1.46	1.47	1.03
	C			.11	.24	.56	C			1.90	1.90	1.25
	D				.22	.49	D				1.00	1.52
	F					.49	F					1.52
MD		B	C	D	F	W		B	C	D	F	W
	A	.62	.69	.07	1.18	.27	A	1.04	1.16	1.01	2.05	1.09
	B		.04	.52	.86	.42	B		1.20	1.04	2.14	1.04
	C			.56	.98	.46	C			1.16	1.78	1.25
	D				1.16	.25	D				2.07	1.08
	F					1.04	F					2.22
E		B	C	D	F	W		B	C	D	F	W
	A	.42	2.80*	.31	1.37	3.96*	A	1.59	1.03	2.39	1.66	1.01
	B		2.49*		1.47	3.68*	B		1.54	1.50	1.04	1.59
	C			1.73	.19	1.31	C			2.33	1.62	1.02
	D				1.58	2.54*	D				1.45	2.38
	F					.29	F					1.64

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 03

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	.06	.59			1.41	A	2.95	1.10			1.80
	B		.46			1.45	B		2.70			1.64
	C					2.02*	C					1.64
	D						D					
	F						F					
CSO		B	C	D	F	W		B	C	D	F	W
	A	.85	.26			.62	A	1.25	1.35			1.15
	B		1.21			1.31	B		1.07			1.09
	C					.58	C					1.18
	D						D					
	F						F					
CAG		B	C	D	F	W		B	C	D	F	W
	A	.55	.12			1.41	A	1.62	1.55			1.93
	B		.63			2.00	B		1.04			1.19
	C					1.93	C					1.25
	D						D					
	F						F					
CEC		B	C	D	F	W		B	C	D	F	W
	A		.20			.07	A	37.45*	1.70			1.41
	B		.15			.07	B		20.00*			50.00*
	C					.04	C					2.38
	D						D					
	F						F					
CAT		B	C	D	F	W		B	C	D	F	W
	A		1.06			1.12	A	2.63	1.09			1.08
	B		.64			.69	B		2.43			2.85
	C					.42	C					1.18
	D						D					
	F						F					
CSD		B	C	D	F	W		B	C	D	F	W
	A	.90	.50			.10	A	1.85	1.08			4.47
	B		.21			.16	B		2.01			8.34
	C					.49	C					4.15
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 03

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	1.16	.36			.34	A	6.29	1.44			2.15
	B		1.17			1.14	B		4.35			2.94
	C					.15	C					1.50
	D						D					
	F						F					
CEA		B	C	D	F	W		B	C	D	F	W
	A	1.62	.62			1.47	A	1.77	1.85			2.50
	B		.89			.02	B		3.23			4.55
	C					.99	C					1.37
	D						D					
	F						F					
CN		B	C	D	F	W		B	C	D	F	W
	A	.49	1.04			2.54*	A	1.59	1.12			1.45
	B		.13			1.43	B		1.42			2.30
	C					1.85*	C					1.62
	D						D					
	F						F					
CQ		B	C	D	F	W		B	C	D	F	W
	A	1.08	.64			.08	A	8.06	1.92			2.04
	B		1.05			.82	B		4.17			16.67
	C					.57	C					4.00*
	D						D					
	F						F					
CI		B	C	D	F	W		B	C	D	F	W
	A	3.16*	1.80*			1.19	A	19.50*	2.15			1.13
	B		3.34*			2.11*	B		9.09			16.67
	C					.39	C					1.89
	D						D					
	F						F					
CP		B	C	D	F	W		B	C	D	F	W
	A	.68	.48			1.23	A	1.11	1.22			1.19
	B		.97			1.65	B		1.35			1.08
	C					.89	C					1.44
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 03

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.67	.09			.76	A	2.04	1.10			1.21
	B		.74			.05	B		2.23			2.46
	C					.80	C					1.11
	D						D					
	F						F					
MR		B	C	D	F	W		B	C	D	F	W
	A	.50	1.46			.19	A	2.78	1.37			1.23
	B		.22			.28	B		3.75*			3.38
	C					.86	C					1.11
	D						D					
	F						F					
MI		B	C	D	F	W		B	C	D	F	W
	A		1.79*			.14	A	1.82	1.46			1.28
	B		1.23			.12	B		1.25			2.33
	C					1.12	C					1.89
	D						D					
	F						F					
MD		B	C	D	F	W		B	C	D	F	W
	A	1.34	.44			.73	A	9.26	2.11			2.85
	B		1.65			1.07	B		4.35			3.23
	C					.72	C					1.35
	D						D					
	F						F					
E		B	C	D	F	W		B	C	D	F	W
	A	1.19	.91			1.05	A	1.96	1.37			2.27
	B		.84			.02	B		1.43			4.55
	C					.79	C					3.13
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 04

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	.72	1.14	.92	.67	.33	A	1.30	1.72	1.89	2.13	1.75
	B		.48	.63	.32	.90	B		2.22*	2.44	2.78	2.27
	C			.27	.02	1.20	C			1.09	1.23	1.01
	D				.18	.86	D				1.14	1.07
	F					.69	F					1.22
CSO		B	C	D	F	W		B	C	D	F	W
	A	.42	.78	.48	.28	.83	A	1.15	1.01	1.06	1.61	1.33
	B		.29	.28	.04	.52	B		1.16	1.22	1.85	1.54
	C			.14	.10	.37	C			1.04	1.59	1.32
	D				.16	.06	D				1.54	1.25
	F					.26	F					1.21
CAG		B	C	D	F	W		B	C	D	F	W
	A	.10	1.29	.32	.65	.46	A	1.39	2.23*	3.41	1.79	5.11*
	B		1.53	.44	.69	.42	B		1.61	2.46	1.29	3.68*
	C			.20	1.78*	1.93*	C			1.53	1.25	2.29
	D				1.06	1.14	D				1.89	1.50
	F					.62	F					2.86
CEC		B	C	D	F	W		B	C	D	F	W
	A	.96	.72	.86	1.68	.26	A	1.18	1.26	2.42	3.50	1.27
	B		.61	.27	.95	.54	B		1.48	2.84	4.11	1.09
	C			.64	1.53	.24	C			1.93	2.78	1.59
	D				.81	.59	D				1.44	3.03
	F					1.29	F					4.35
CAT		B	C	D	F	W		B	C	D	F	W
	A	.70	.22	1.52	1.82*	.18	A	1.26	1.25	1.41	2.13	1.20
	B		.54	1.28	2.49*	.45	B		1.59	1.79	1.69	1.05
	C			1.36	1.81*	.01	C			1.12	2.67	1.50
	D				2.77*	1.42	D				3.00	1.68
	F					2.03*	F					1.79
CSD		B	C	D	F	W		B	C	D	F	W
	A	1.08	.61	.03	.76	.74	A	1.11	1.43	4.27	1.37	1.59
	B		.88	.61	.13	.09	B		1.29	3.86	1.54	1.75
	C			.27	.64	.56	C			2.99	1.96	2.27*
	D				.57	.40	D				5.88	6.67
	F					.15	F					1.15

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 04

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	.22	.56	.29	1.34	.14	A	2.57*	2.17*	9.54	5.24	2.70
	B		.31	.29	2.28*	.45	B		1.18	3.71	2.04	1.05
	C			.13	2.35*	.73	C			4.39	2.41	1.24
	D				2.86*	.59	D				1.82	3.57
	F					1.92*	F					1.92
CEA		B	C	D	F	W		B	C	D	F	W
	A	1.57	.19	1.30	.57	1.17	A	1.21	1.15	1.30	2.72	1.18
	B		1.80*	.53	.44	.17	B		1.05	1.56	2.24	1.03
	C			1.39	.53	1.25	C			1.49	2.36	1.02
	D				.80	.59	D				3.53	1.53
	F					.30	F					2.33
CN		B	C	D	F	W		B	C	D	F	W
	A	1.29	2.41*	2.51*	2.15*	1.55	A	1.11	1.35	1.67	1.02	1.54
	B		.96	1.68	1.28	.50	B		1.20	1.85	1.13	1.39
	C			1.14	.73	.20	C			2.24	1.37	1.15
	D				.49	1.12	D				1.64	2.56
	F					.74	F					1.56
CQ		B	C	D	F	W		B	C	D	F	W
	A	1.55	2.91*	2.68*	.68	2.53*	A	1.32	1.03	1.18	1.54	1.06
	B		.81	1.55	1.50	.98	B		1.35	1.54	1.18	1.39
	C			1.47	2.30*	.57	C			1.15	1.59	1.03
	D				2.40*	1.05	D				1.82	1.11
	F					2.25*	F					1.63
CI		B	C	D	F	W		B	C	D	F	W
	A	.07	1.44	1.46	.70	.70	A	1.33	1.45	21.93*	13.85*	1.25
	B		1.28	1.23	.65	.57	B		1.93*	29.18*	18.43*	1.67
	C			1.07	1.70*	.28	C			15.09	9.53*	1.16
	D				6.48*	1.12	D				1.59	16.67
	F					1.36	F					11.11*
CP		B	C	D	F	W		B	C	D	F	W
	A	.41	1.42	1.79*	2.39*	.35	A	1.35	1.35	44.79*	1.37	1.22
	B		.91	1.32	1.84*	.01	B		1.01	60.42*	1.85	1.11
	C			.90	1.43	.75	C			60.87*	1.86	1.12
	D				.46	1.39	D				33.33*	50.00*
	F					1.86*	F					1.67

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 04

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	1.37	.03	.71	.55	1.01	A	1.09	1.19	2.22	4.35*	1.43
	B		1.54	1.45	1.25	.22	B		1.30	2.44	4.76*	1.31
	C			.73	.64	1.02	C			1.89	3.57*	1.70
	D				.07	1.31	D				1.92	3.19*
	F					1.01	F					6.13*
MR		B	C	D	F	W		B	C	D	F	W
	A	.70	1.09	1.29	.05	.34	A	1.04	1.52	11.38	2.01	1.75
	B		.34	1.67	.50	.20	B		1.45	11.88	2.10	1.69
	C			1.57	.61	.48	C			17.21	3.04	1.16
	D				1.68	1.15	D				5.56	20.00*
	F					.25	F					3.57
MI		B	C	D	F	W		B	C	D	F	W
	A		.11	.03	.91	.43	A	1.14	1.30	1.15	1.01	1.39
	B		.11	.03	.86	.41	B		1.14	1.31	1.13	1.59
	C			.02	.81	.34	C			1.49	1.28	1.81
	D				.65	.25	D				1.16	1.21
	F					.66	F					1.41
MD		B	C	D	F	W		B	C	D	F	W
	A	.63	.79	.43	.32	.99	A	1.13	1.89	1.82	2.13	1.22
	B		1.37	.12	.03	.51	B		2.13*	2.04	2.38	1.37
	C			.70	.67	1.50	C			1.05	1.12	1.56
	D				.08	.17	D				1.18	1.48
	F					.31	F					1.75
E		B	C	D	F	W		B	C	D	F	W
	A	.72	1.56	1.18	1.98*	.87	A	3.49*	1.19	2.80	1.35	1.01
	B		.89	1.51	2.66*	.51	B		2.94*	1.25	2.56	3.57
	C			.56	1.42	.18	C			2.35	1.14	1.20
	D				.63	.58	D				2.08	2.86
	F					1.27	F					1.37

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 05

SCALE		t STATISTICS					F STATISTICS				
		B	C	D	F	W	B	C	D	F	W
CAP	A	.43	.42	.98	.25	.01	1.12	1.18	1.48	2.36	1.06
	B		.01	.62	.02	.54		1.04	1.67	2.65	1.05
	C			.62	.02	.53			1.74	2.77	1.10
	D				.34	1.07				1.59	1.59
	F					.25					2.50
CSO	A	1.95*	1.14	3.58*	1.30	2.74*	1.64	4.17*	3.03	3.23	4.76*
	B		.24	2.81*	.23	2.28*		2.56*	1.89	2.00	2.94*
	C			2.23*	.22	2.04*			1.35	1.26	1.18
	D				.90	.28				1.06	1.59
	F					.61					1.49
CAG	A	1.42	1.63	2.36*	2.79*	2.63*	1.37	1.69	2.08	1.28	1.08
	B		.45	1.60	1.86*	1.40		1.23	1.52	1.08	1.28
	C			1.21	1.53	.92			1.23	1.33	1.57
	D				.80	.48				1.65	1.96
	F					1.40					1.19
CEC	A	.38	.21	1.23	1.28	.41	1.18	1.36	1.62	2.39	1.26
	B		.28	1.11	1.65	.08		1.16	1.38	2.03	1.07
	C			1.41	1.67	.33			1.19	1.75	1.09
	D				2.45*	.99				1.47	1.30
	F					1.71					1.89
CAT	A	.89	.72	1.87*	1.67	.35	1.23	1.06	1.30	6.39	1.75
	B		.19	1.45	1.42	.41		1.16	1.05	5.19	2.13*
	C			1.54	1.39	.27			1.22	6.02	1.85
	D				.70	1.34				4.93	2.27
	F					1.11					11.11
CSD	A	.23	1.10	1.54	.82	1.18	1.82	1.15	2.18	1.43	1.03
	B		1.01	1.09	.55	.97		1.58	3.95*	1.27	1.86
	C			.40	.27	.14			2.50	1.25	1.18
	D				.14	.27				3.13	2.13
	F					.22					1.46

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 05

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	.31	.10	.40	.90	.91	A	1.15	1.33	1.38		1.47
	B		.35	.11	1.02	1.56	B		1.54	1.59		1.27
	C			.43	1.12	1.50	C			1.03		1.96
	D				1.33	1.42	D					2.00
	F					.26	F					
CEA		B	C	D	F	W		B	C	D	F	W
	A	.26	.43	.45	1.93*	.42	A	1.33	1.06	3.71*	2.44	1.75
	B		.95	.12	1.61	.26	B		1.42	4.95*	3.26	1.30
	C			1.02	2.30*	1.08	C			3.49*	2.30	1.85
	D				3.19*	.14	D				1.52	6.67*
	F					1.29	F					4.35
CN		B	C	D	F	W		B	C	D	F	W
	A	.02	1.65	1.49	2.01*	.20	A	1.31	1.84	2.35	67.22	2.73*
	B		2.37*	1.91*	2.38*	.28	B		1.40	1.79	51.15	2.07
	C			.18	1.85*	2.06*	C			1.28	36.58	1.48
	D				1.95*	2.00*	D				28.58	1.16
	F					3.23*	F					25.00
CQ		B	C	D	F	W		B	C	D	F	W
	A	.18	.13	1.43	1.54	.43	A	1.15	1.04	3.21*	1.76	1.37
	B		.05	1.45	1.63	.81	B		1.20	2.79*	1.53	1.56
	C			1.38	1.51	.75	C			3.35*	1.84	1.32
	D				1.50	1.85*	D				1.82	4.35*
	F					1.59	F					2.38
CI		B	C	D	F	W		B	C	D	F	W
	A	.47	.06	.29	.80	.56	A	1.54	1.41	1.08		1.27
	B		.66	.92	.75	1.37	B		2.17*	1.67		1.96
	C			.26	.72	.62	C			1.32		1.11
	D				.95	.28	D					1.18
	F					1.03	F					
CP		B	C	D	F	W		B	C	D	F	W
	A	.18	1.58	.13	1.67	.08	A	1.33	1.20	1.51	2.62	1.01
	B		1.74*	.07	1.42	.13	B		1.60	2.00	3.47	1.34
	C			1.63	1.06	1.80*	C			1.25	2.17	1.19
	D				1.98*	.05	D				1.73	1.49
	F					1.68	F					2.63

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 05

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.13	.06	.77	2.06*	.05	A	1.35	1.05	3.70*	1.39	1.79
	B		.27	.96	2.00*	.20	B		1.29	2.70*	1.03	1.33
	C			1.22	2.16*		C			3.57*	1.32	1.69
	D				1.53	.91	D				2.66	2.07
	F					1.63	F					1.28
MR		B	C	D	F	W		B	C	D	F	W
	A	.55	1.43	1.60	.02	1.22	A	1.69	1.05	1.10	3.70	1.00
	B		.94	1.01	.25	.65	B		1.62	1.87	2.17	1.70
	C			.40	.69	.15	C			1.16	3.57	1.05
	D				.83	.50	D				4.17	1.10
	F					.61	F					3.72
MI		B	C	D	F	W		B	C	D	F	W
	A	.06	1.28	1.42	.06	.12	A	1.76	2.37*	1.72	3.49	2.04
	B		1.80*	1.98*	.04	.26	B		1.35	1.02	1.98	1.16
	C			.81	.68	1.93*	C			1.37	1.47	1.16
	D				.90	2.11*	D				2.03	1.18
	F					.16	F					1.72
MD		B	C	D	F	W		B	C	D	F	W
	A	.40	.21	.75	1.32	1.31	A	1.10	1.09	1.28	11.97*	1.54
	B		.27	1.35	1.08	1.04	B		1.01	1.18	13.12*	1.68
	C			1.17	1.19	1.32	C			1.19	13.01*	1.67
	D				1.60	2.25*	D				15.44*	1.98
	F					.85	F					7.69
E		B	C	D	F	W		B	C	D	F	W
	A	2.04*	3.32*	2.74*	.65	2.09*	A	3.45*	2.27	2.33	4.49	2.63
	B		1.01	.46	.63	.14	B		1.50	1.48	15.40	1.31
	C			.31	1.20	1.12	C			1.02	10.24	1.15
	D				1.02	.60	D				10.40	1.14
	F					.65	F					12.50

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 06

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	1.71*	.40	.27	.45	2.20*	A	1.23	1.00	1.43	6.71	1.60
	B		1.58	1.20	1.20	.45	B		1.24	1.76	8.29	1.98
	C			.06	.65	1.97*	C			1.42	6.67	1.60
	D				.71	1.86*	D				4.71	1.13
	F					1.95*	F					4.17
CSO		B	C	D	F	W		B	C	D	F	W
	A	1.06	1.68	1.54	1,70	1.79*	A	2.38	2.78*	3.03*	2.04	2.44
	B		.67	.58	.73	.72	B		1.18	1.27	1.17	1.02
	C			.09	.41	.15	C			1.08	1.38	1.15
	D				.33	.04	D				1.48	1.24
	F					.35	F					1.19
CAG		B	C	D	F	W		B	C	D	F	W
	A	1.31	.93	1.27	.11	2.67*	A	1.05	1.73	1.98	2.88	1.20
	B		.69	.16	.74	1.76*	B		1.65	1.89	2.75	1.27
	C			.79	.63	2.67*	C			1.14	1.67	2.08
	D				1.07	1.37	D				1.46	2.38
	F					1.47	F					3.45
CEC		B	C	D	F	W		B	C	D	F	W
	A	2.12*	1.64	.30	.79	.62	A	1.74	1.50	2.85	1.89	1.19
	B		.63	1.75*	.09	1.14	B		1.16	1.63	1.08	2.08
	C			1.18	.17	.69	C			1.89	1.26	1.79
	D				.98	.34	D				1.52	3.33
	F					.40	F					2.22
CAT		B	C	D	F	W		B	C	D	F	W
	A	.56	.50	.20	.49	1.43	A	1.10	1.35	1.68	2.78	1.67
	B		1.16	.69	.74	1.06	B		1.22	1.85	3.05	1.52
	C			.24	.21	1.92*	C			2.26	3.74	1.23
	D				.48	1.43	D				1.65	2.78
	F					1.07	F					4.55
CSD		B	C	D	F	W		B	C	D	F	W
	A	.50	1.04	.37	.11	.20	A	4.72*	2.16*	3.42	1.00	2.90*
	B		2.30*	1.33	.11	1.03	B		2.17*	1.37	4.76*	1.64
	C			.54	.72	.90	C			1.58	2.17	1.34
	D				.47	.27	D				3.45	1.18
	F					.32	F					2.91

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICE - INSTRUCTOR 06

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	1.01	1.12	1.02	.18	1.69	A	1.27	1.62	3.18	2.32	1.45
	B		.02	.19	.30	1.09	B		1.28	2.51	1.83	1.85
	C			.22	.34	1.23	C			1.96	1.43	2.38*
	D				.58	.76	D				1.37	4.55*
	F					.68	F					3.33
CEA		B	C	D	F	W		B	C	D	F	W
	A	1.52	1.19	1.20	1.03	.88	A	1.48	1.90	1.46		1.72
	B		.61	.07	.46	.52	B		1.29	1.01		1.16
	C			.55	.80	.06	C			1.30		1.11
	D				.41	.50	D					1.18
	F					.78	F					
CN		B	C	D	F	W		B	C	D	F	W
	A	2.20*	4.64*	3.37*	.62	3.26*	A	2.08	1.61	1.42	1.57	1.45
	B		2.09*	.79	.50	.88	B		1.30	2.97	3.28	1.44
	C			.88	1.49	.88	C			2.29	2.53	1.1[illegible]
	D				1.44	.05	D				1.10	2.08
	F					1.08	F					2.27
CQ		B	C	D	F	W		B	C	D	F	W
	A	.69	1.13	1.07	.56	.60	A	1.36	1.24	1.27	2.27	1.70
	B		.51	1.87*	.33	1.42	B		1.10	1.06	3.13	1.25
	C			2.22*	.13	1.83*	C			1.03	2.86	1.37
	D				1.15	.62	D				2.94	1.34
	F					1.00	F					3.91
CI		B	C	D	F	W		B	C	D	F	W
	A	.36	.34	3.05*	.63	1.95	A	2.38	2.17	1.61	21.54	1.61
	B		.03	2.13*	.56	1.31	B		1.09	1.50	51.68	1.48
	C			2.28*	.57	1.42	C			1.37	47.30	1.35
	D				2.07*	1.01	D				34.54	1.01
	F					1.44	F					33.33
CP		B	C	D	F	W		B	C	D	F	W
	A	1.25	3.31*	1.76*	.37	2.30*	A	3.03*	2.27	1.82	4.17	2.44
	B		1.75*	.35	.26	.86	B		1.32	1.64	1.37	1.23
	C			1.02	1.06	.57	C			1.24	1.82	1.08
	D				.51	.43	D				2.22	1.33
	F					.71	F					1.68

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - INSTRUCTOR 06

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.32	.33	.75	.66	.03	A	1.13	1.28	2.11	34.69	1.02
	B		.04	.52	.86	.33	B		1.43	1.88	30.84	1.15
	C			.42	.74	.33	C			2.70	44.35	1.25
	D				1.53	.75	D				16.43	2.17
	F					.63	F					33.33
MR		B	C	D	F	W		B	C	D	F	W
	A	1.89*	1.02	1.62	.15	.64	A	1.23	1.34	1.39	1.35	1.96
	B		1.15	.17	.74	1.24	B		1.09	1.13	1.67	1.59
	C			1.05	.30	.28	C			1.04	1.82	1.47
	D				.80	1.26	D				1.89	1.41
	F					.19	F					2.65
MI		B	C	D	F	W		B	C	D	F	W
	A	1.44	1.20	1.89*	.31	.32	A	1.08	1.21	1.59	10.00	1.31
	B		.39	.76	1.03	1.75*	B		1.12	1.47	9.24	1.21
	C			1.11	.92	1.54	C			1.32	8.28	1.08
	D				1.70	2.31*	D				6.29	1.22
	F					.16	F					7,69
MD		B	C	D	F	W		B	C	D	F	W
	A	.84	.23	.59	.13	1.00	A	1.15	1.11	1.51	1.52	1.52
	B		.72	.09	.55	.27	B		1.03	1.32	1.32	1.33
	C			.46	.25	.90	C			1.36	1.37	1.37
	D				.54	.33	D				1.01	1.01
	F					.75	F					1.00
E		B	C	D	F	W		B	C	D	F	W
	A	2.06*	3.40*	4.75*	3.40*	2.46*	A	1.30	2.38	1.23	25.93	1.10
	B		1.89*	2.98*	2.06*	.55	B		1.82	1.06	33.71	1.19
	C			1.06	.83	1.08	C			1.92	61.21	2.15
	D				.35	2.36	D				31.93	1.12
	F					1.91	F					25.00

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP I

SCALE	t STATISTICS						F STATISTICS					
CAP		B	C	D	F	W		B	C	D	F	W
	A	1.46	1.40			1.04	A	1.94	1.04			6.61*
	B		2.52*			.65	B		2.00			3.41
	C					2.03*	C					6.85*
	D						D					
	F						F					
CSO		B	C	D	F	W		B	C	D	F	W
	A	1.58	2.11*			.86	A	4.76*	2.86*			1.64
	B		.16			.62	B		1.70			2.96
	C					.74	C					1.74
	D						D					
	F						F					
CAG		B	C	D	F	W		B	C	D	F	W
	A	2.00*	.36			2.05*	A	1.19	1.15			1.50
	B		2.65*				B		1.03			1.26
	C					2.67*	C					1.31
	D						D					
	F						F					
CEC		B	C	D	F	W		B	C	D	F	W
	A	1.21	1.26			.32	A	1.65	1.46			1.07
	B		.71			1.41	B		1.14			1.54
	C					1.31	C					1.35
	D						D					
	F						F					
CAT		B	C	D	F	W		B	C	D	F	W
	A	1.42	.27				A	16.10*	1.35			1.52
	B		1.06			1.17	B		20.00*			25.00*
	C					.18	C					1.11
	D						D					
	F						F					
CSD		B	C	D	F	W		B	C	D	F	W
	A	.53	1.63			1.74	A	2.41	1.02			1.33
	B		1.69*			2.07*	B		2.38			3.23
	C					.98	C					1.35
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP I

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	3.42*	2.20*			2.70*	A	1.08	1.09			1.29
	B		2.32*			.73	B		1.01			1.39
	C					1.41	C					1.40
	D						D					
	F						F					
CEA		B	C	D	F	W		B	C	D	F	W
	A	1.93*	.28			.77	A	3.38	1.37			1.33
	B		2.18*			.88	B		2.50			4.55
	C					.86	C					1.82
	D						D					
	F						F					
CN		B	C	D	F	W		B	C	D	F	W
	A	.13	2.01*			2.15*	A	1.05	1.04			1.67
	B		1.20			1.59	B		1.10			1.59
	C					1.35	C					1.75
	D						D					
	F						F					
CQ		B	C	D	F	W		B	C	D	F	W
	A	.82	1.20			1.60	A	1.76	2.42*			3.32
	B		.48			.85	B		1.38			1.89
	C					1.69*	C					1.37
	D						D					
	F						F					
CI		B	C	D	F	W		B	C	D	F	W
	A	.92	.08			.73	A	2.90	1.62			14.25*
	B		1.18			.37	B		1.79			4.91
	C					.89	C					8.79*
	D						D					
	F						F					
CP		B	C	D	F	W		B	C	D	F	W
	A	.02	1.38			1.78*	A	1.43	1.52			1.43
	B		.90			1.31	B		1.05			1.00
	C					.84	C					1.06
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP I

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.71	.30			.72	A	1.71	1.04			2.15
	B		.56				B		1.79			1.26
	C					.56	C					2.23
	D						D					
	F						F					
MR		B	C	D	F	W		B	C	D	F	W
	A	1.15	1.05			.05	A	1.12	1.08			1.01
	B		.59			.99	B		1.04			1.10
	C					.76	C					1.06
	D						D					
	F						F					
MI		B	C	D	F	W		B	C	D	F	W
	A	.13	1.19			.85*	A	2.33	1.12			1.01
	B		.93			.45	B		2.06			2.34
	C					1.72*	C					1.13
	D						D					
	F						F					
MD		B	C	D	F	W		B	C	D	F	W
	A	.43	1.68*			1.59	A	1.11	1.13			3.00
	B		.63			1.99*	B		1.02			2.70
	C					2.96*	C					2.65
	D						D					
	F						F					
E		B	C	D	F	W		B	C	D	F	W
	A	1.89*	3.02*			1.90*	A	1.47	1.33			2.04
	B		.21			.24	B		1.96			2.94
	C					.11	C					1.52
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP II

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	1.39	1.46	.23	.92	.98	A	1.28	1.04	1.11	1.01	1.15
	B		.07	.93	.04	2.60*	B		1.23	1.15	1.27	1.12
	C			.90	.01	2.81*	C			1.07	1.03	1.10
	D				.66	1.08	D				1.10	1.03
	F					1.74*	F					1.13
CSO		B	C	D	F	W		B	C	D	F	W
	A	.68	.06	1.90*	1.41	.72	A	1.50	1.09	1.01	1.01	1.05
	B		.75	2.79*	1.12	.09	B		1.37	1.52	1.52	1.43
	C			2.26*	1.57	.84	C			1.11	1.10	1.04
	D				2.79*	2.59*	D				1.00	1.07
	F					.94	F					1.06
CAG		B	C	D	F	W		B	C	D	F	W
	A	.31	.53	.88	.43	1.63	A	1.44	1.69	1.68	1.36	1.82*
	B		.17	1.31	.75	2.24*	B		1.17	1.17	1.05	1.26
	C			1.65	.98	2.90*	C			1.00	1.23	1.08
	D				.37	.41	D				1.23	1.08
	F					.80	F					1.34
CEC		B	C	D	F	W		B	C	D	F	W
	A	1.53	.99	.65	2.27*	.69	A	1.04	1.00	1.10	1.28	1.11
	B		.83	1.93*	1.10	.86	B		1.04	1.15	1.33	1.06
	C			1.50	1.76*	.19	C			1.10	1.28	1.11
	D				2.69*	1.21	D				1.16	1.23
	F					1.71*	F					1.43
CAT		B	C	D	F	W		B	C	D	F	W
	A	1.69*	2.01*	3.45*	.28	.85	A	1.05	1.18	1.30	1.15	1.09
	B		.21	2.13*	.96	.85	B		1.23	1.24	1.20	1.14
	C			1.95*	1.08	1.16	C			1.53	1.03	1.09
	D				2.53*	2.73*	D				1.49	1.41
	F					.33	F					1.06
CSD		B	C	D	F	W		B	C	D	F	W
	A	.11	.59	.07	1.28	.47	A	1.11	1.09	1.64	1.25	1.34
	B		.48	.02	1.33	.59	B		1.21	1.82	1.38	1.48
	C			.40	1.86*	1.24	C			1.51	1.15	1.23
	D				1.39	.50	D				1.32	1.23
	F					1.09	F					1.07

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP II

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	.24	.56	1.95*	.46	.16	A	1.48	1.86*	2.62*	1.23	1.55
	B		.28	2.08*	.35	.48	B		1.25	1.77	1.20	1.05
	C			2.21*	.23	.90	C			1.41	1.52	1.19
	D				1.34	2.54*	D				2.13	1.69
	F					.69	F					1.26
CEA		B	C	D	F	W		B	C	D	F	W
	A	1.38	.92	.80	1.12	1.48	A	1.12	1.18	1.53	1.67	1.22
	B		.57	.38	.08	.20	B		1.33	1.36	1.48	1.37
	C			.07	.45	.79	C			1.81	1.97	1.04
	D				.42	.50	D				1.09	1.89
	F					.08	F					2.04
CN		B	C	D	F	W		B	C	D	F	W
	A	2.14*	3.15*	2.15*	2.19*	2.15*	A	1.05	1.03	1.02	1.08	1.32
	B		.70	.40	.62	.12	B		1.02	1.07	1.03	1.25
	C			.08	.21	.54	C			1.05	1.04	1.28
	D				.23	.28	D				1.10	1.33
	F					.49	F					1.22
CQ		B	C	D	F	W		B	C	D	F	W
	A	.09	.40	1.72*	.80	.06	A	1.19	1.12	1.26	1.39	1.01
	B		.29	1.57	.83	.03	B		1.34	1.51	1.15	1.19
	C			1.68*	1.22	.35	C			1.13	1.54	1.14
	D				2.06*	1.72*	D				1.75	1.28
	F					.87	F					1.37
CI		B	C	D	F	W		B	C	D	F	W
	A	1.05	1.58	.06	.70	1.72	A	1.12	1.50	1.62	1.80	1.18
	B		.14	.85	.14	.57	B		1.69*	1.81	2.02	1.32
	C			1.25	.30	.63	C			1.08	1.20	1.27
	D				.70	1.46	D				1.12	1.37
	F					.62	F					1.54
CP		B	C	D	F	W		B	C	D	F	W
	A	1.54	1.24	.61	2.71*	.54	A	1.12	1.27	1.10	1.79	1.05
	B		.46	.64	1.41	1.07	B		1.12	1.02	2.01	1.07
	C			.33	1.70*	.72	C			1.15	2.27	1.20
	D				1.89*	.19	D				1.97	1.04
	F					2.27*	F					1.89

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP II

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.21	1.10	1.10	.56	.67	A	1.42	1.19	1.79	1.67	1.47
	B		.96	1.09	.49	.52	B		1.19	2.56*	2.38*	1.03
	C			.58	.06	.42	C			2.13*	1.96*	1.24
	D				.35	.79	D				1.08	2.64*
	F					.18	F					2.43*
MR		B	C	D	F	W		B	C	D	F	W
	A	.90	1.41	1.28	.36	1.61	A	1.12	1.02	1.50	1.16	1.28
	B		.34	.48	.30	.60	B		1.14	1.69	1.04	1.43
	C			.27	.58	.35	C			1.48	1.18	1.25
	D				.70	.02	D				1.75	1.18
	F					.79	F					1.48
MI		B	C	D	F	W		B	C	D	F	W
	A	.06	.61	.97	.03	.34	A	1.54	1.42	2.20*	3.43*	1.48
	B		.61	1.10	.09	.32	B		1.09	1.43	2.23	1.04
	C			.68	.51	.26	C			1.55	2.42*	1.04
	D				1.18	.84	D				1.56	1.49
	F					.33	F					2.33
MD		B	C	D	F	W		B	C	D	F	W
	A	.70	.14	.97	.18	.80	A	1.02	1.59	1.49	1.49	1.45
	B		.86	1.53	.68	.01	B		1.54	1.45	1.45	1.49
	C			.84	.08	.93	C			1.06	1.06	2.30*
	D				.56	1.75*	D				1.00	2.17*
	F					.79	F					2.17*
E		B	C	D	F	W		B	C	D	F	W
	A	2.42*	1.78*	1.23	1.79*	2.60*	A	1.71	1.43	1.58	1.32	1.08
	B		1.15	.75	.20	.44	B		1.19	1.08	1.30	1.59
	C			.07	.95	1.61	C			1.10	1.09	1.33
	D				.73	.97	D				1.20	1.47
	F					.12	F					1.22

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP III

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	2.44*	.01	1.70*	1.13	1.44	A	1.12	1.01	2.36*	1.37	1.15
	B		2.84*	.76	.13	1.27	B		1.14	2.11*	1.52	1.28
	C			1.79*	1.19	1.76*	C			2.39*	1.35	1.12
	D				.32	.29	D				3.23*	2.70*
	F					.40	F					1.19
CSO		B	C	D	F	W		B	C	D	F	W
	A	.18	.37	1.81*	.68	2.86*	A	2.04*	1.75	2.63*	1.79	2.33*
	B		.19	1.71*	.44	3.29*	B		1.15	1.28	1.14	1.14
	C			1.59	.37	3.01*	C			1.47	1.01	1.32
	D				.52	.66	D				1.46	1.12
	F					.96	F					1.30
CAG		B	C	D	F	W		B	C	D	F	W
	A	1.20	1.34	2.59*	1.16	3.71*	A	1.13	1.79	1.29	1.64	1.00
	B			1.82*	.55	3.21*	B		1.59	1.15	1.45	1.12
	C			2.06*	.67	3.26*	C			1.39	1.10	1.79*
	D				.52	.62	D				1.27	1.28
	F					.83	F					1.64
CEC		B	C	D	F	W		B	C	D	F	W
	A	.75	1.36	.43	.10	.11	A	1.06	1.49	1.52	2.05	1.38
	B		2.58*	.16	.34	1.27	B		1.41	1.61	1.94	1.30
	C			1.76*	1.00	1.79*	C			2.27*	1.38	1.09
	D				.18	.73	D				3.11	2.09*
	F					.19	F					1.49
CAT		B	C	D	F	W		B	C	D	F	W
	A	.81	.70	1.73*	.78	.30	A	1.02	1.28	1.47	3.99	2.08*
	B		1.76*	2.75*	1.27	.46	B		1.27	1.49	4.05	2.04*
	C			1.00	.29	1.13	C			1.89	5.14	1.61
	D				.37	1.78*	D				2.72	3.03*
	F					.72	F					8.33*
CSD		B	C	D	F	W		B	C	D	F	W
	A	.81	.04	.61	.05	.78	A	1.15	1.17	1.42	1.23	1.22
	B		.93	1.55	.54	2.18*	B		1.02	1.24	1.08	1.06
	C			.75	.09	1.03	C			1.21	1.06	1.04
	D				.36	.02	D				1.15	1.16
	F					.38	F					1.02

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP III

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	.08	1.16	1.79*	.41	2.33*	A	1.16	1.04	1.02	1.15	1.33
	B		1.26	1.87*	.36	2.87*	B		1.12	1.19	1.34	1.15
	C			.84	.26	1.45	C			1.06	1.20	1.28
	D				.74	.33	D				1.13	1.37
	F					.87	F					1.54
CEA		B	C	D	F	W		B	C	D	F	W
	A	.21	1.65	2.84*	1.24	1.58	A	2.86*	1.45	1.10	1.92	1.72
	B		1.28	1.92*	.73	1.43	B		1.99*	3.16*	1.51	1.67*
	C			1.14	.24	.09	C			1.59	1.32	1.19
	D				.43	1.20	D				2.08	1.89
	F					.27	F					1.11
CN		B	C	D	F	W		B	C	D	F	W
	A	.03	1.70*	1.59	.66	2.77*	A	1.35	1.19	1.22	1.51	1.43
	B		2.26*	2.07*	.81	3.81*	B		1.61	1.64	1.12	1.92*
	C			.11	.36	1.28	C			1.02	1.81	1.19
	D				.41	.90	D				1.85	1.16
	F					.90	F					2.17
CQ		B	C	D	F	W		B	C	D	F	W
	A	1.63	1.23	.63	1.06	1.84*	A	1.00	1.09	1.12	1.35	1.06
	B		.49	.84	.20	.05	B		1.09	1.12	1.33	1.06
	C			.45	.44	.60	C			1.22	1.45	1.02
	D				.62	.97	D				1.19	1.20
	F					.19	F					1.42
CI		B	C	D	F	W		B	C	D	F	W
	A	.89	.79	1.19	1.20	.07	A	1.05	1.02	1.45	1.15	1.33
	B		2.03*	2.29*	.79	1.01	B		1.08	1.37	1.20	1.41
	C			.47	1.71	1.06	C			1.48	1.12	1.30
	D				2.17*	1.32	D				1.67	1.92
	F					1.10	F					1.16
CP		B	C	D	F	W		B	C	D	F	W
	A	.92	.41	.32	.74	1.06	A	1.43	1.28	2.00	1.37	1.54
	B		.60	.45	1.18	2.50*	B		1.11	1.41	1.04	1.09
	C				.93	1.78*	C			1.56	1.06	1.20
	D				.74	1.35	D				1.47	1.30
	F					.11	F					1.14

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP III

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.50	.99	1.13	.28	.15	A	1.61	1.01	1.00	1.08	1.64
	B		.44	1.58	.04	.83	B		1.59	1.62	1.75	1.02
	C			2.24*	.29	1.32	C			1.02	1.10	1.61
	D				1.00	.98	D				1.08	1.64
	F					.32	F					1.79
MR		B	C	D	F	W		B	C	D	F	W
	A	.64	.91	.51	.39		A	1.62	1.75	1.93	1.20	1.60
	B		2.06*	1.38	.11	.97	B		1.08	1.19	1.35	1.02
	C			.34	1.11	1.33	C			1.11	1.45	1.10
	D				.88	.71	D				1.61	1.22
	F					.52	F					1.33
MI		B	C	D	F	W		B	C	D	F	W
	A	.52	.40	2.39*	.09	.21	A	1.13	1.28	1.07	3.57	1.16
	B		1.08	3.36*	.22	.94	B		1.45	1.05	3.17	1.30
	C			2.05*	.31	.29	C			1.37	4.59	1.11
	D				1.75*	2.56*	D				3.34	1.23
	F					.20	F					4.17
MD		B	C	D	F	W		B	C	D	F	W
	A	.74	.25	.10	.69	.10	A	1.35	1.17	1.08	1.09	1.22
	B		.65	.61	.22	1.13	B		1.58	1.26	1.47	1.11
	C			.12	.62	.43	C			1.25	1.08	1.41
	D				.60	.21	D				1.17	1.14
	F					.73	F					1.32
E		B	C	D	F	W		B	C	D	F	W
	A	.60	1.37	2.16*	1.42	3.27*	A	2.05*	1.42	1.01	1.54	1.30
	B		2.70*	3.68*	2.41*	5.30*	B		1.45	2.08*	3.13*	2.63*
	C			1.36	.93	2.64*	C			1.43	2.17	1.82*
	D				.09	.78	D				1.54	1.28
	F					.34	F					1.20

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP IV

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	.20	1.02	1.10	1.94*	.55	A	1.62	2.16	2.66		1.19
	B		.98	1.18	2.37*	.81	B		1.33	1.64		1.37
	C			.44	2.22*	1.66	C			1.23		1.82
	D				2.08*	1.62	D					2.22
	F					2.34*	F					
CSO		B	C	D	F	W		B	C	D	F	W
	A	1.67	.09	1.13	.47	1.34	A	1.02	1.96	1.47		1.30
	B		1.36	.03	.20	.28	B		1.92	1.45		1.28
	C			.89	.36	1.12	C			1.33		1.51
	D				.14	.16	D					1.13
	F					.08	F					
CAG		B	C	D	F	W		B	C	D	F	W
	A	1.13	.29	.18	.92	2.88*	A	1.08	1.32	1.38		1.51
	B		1.24	1.00	1.32	1.49	B		1.22	1.48		1.62
	C			.06	.67	2.78*	C			1.81		1.97
	D				.89	2.44*	D					1.09
	F					2.36*	F					
CEC		B	C	D	F	W		B	C	D	F	W
	A	.06	.12	.19	1.13	.90	A	1.51	3.13	1.82		3.29*
	B		.08	.17	1.36	.95	B		2.07	2.78		2.18
	C			.13	1.89	.96	C			5.88*		1.05
	D				.70	.38	D					6.02*
	F					1.56	F					
CAT		B	C	D	F	W		B	C	D	F	W
	A	.53	1.25	1.58	1.13	.12	A	1.16	2.90	1.84		1.52
	B		.62	1.07	.84	.37	B		3.40	2.15		1.30
	C			.95	1.09	.94	C			1.59		4.35*
	D				.37	1.23	D					2.78
	F					.88	F					
CSD		B	C	D	F	W		B	C	D	F	W
	A	1.16	1.13	1.77*	1.43	2.13*	A	1.39	1.23	1.45		1.47
	B		.02	2.35*	.78	.87	B		1.13	2.00		1.05
	C			2.41*	.81	.79	C			1.78		1.19
	D				2.67*	2.97*	D					2.13
	F					.42	F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP IV

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	.88	.39	.33	.58	.18	A	3.39*	1.19	7.39		1.49
	B		.30	1.59	.54	.80	B		4.00*	2.18		2.27
	C			.62	.36	.28	C			8.85		1.79
	D				1.90	.56	D					5.00
	F					.64	F					
CEA		B	C	D	F	W		B	C	D	F	W
	A	.73	1.65	.54	1.69	2.03*	A	1.61	1.11	1.74		1.68
	B		.74	.08	1.06	.89	B		1.78	2.79		2.69
	C			.81	1.01	.05	C			1.57		1.51
	D				1.72	.97	D					1.04
	F					1.29	F					
CN		B	C	D	F	W		B	C	D	F	W
	A	.31	1.01	2.17*	.63	1.90*	A	1.81	1.19	2.37		1.61
	B		.87	2.51*	.99	1.75*	B		2.13	1.31		2.86
	C			1.16	.98	.73	C			2.81		1.35
	D				2.52*	.45	D					3.85
	F					1.17	F					
CQ		B	C	D	F	W		B	C	D	F	W
	A	.94	.87	1.30	1.36	.65	A	1.30	1.82	1.91		1.15
	B		.07	1.83*	.84	1.53	B		1.41	2.49		1.14
	C			1.59	.67	1.37	C			3.51		1.60
	D				2.64*	.76	D					2.17
	F					1.52	F					
CI		B	C	D	F	W		B	C	D	F	W
	A	1.38	.99	.45	.44	.49	A	1.48	1.53	1.30		1.15
	B		.29	.57	.09	.83	B		1.04	1.14		1.69
	C			.34	.04	.50	C			1.18		1.75
	D				.21	.08	D					1.49
	F					.23	F					
CP		B	C	D	F	W		B	C	D	F	W
	A	.01	.98	.23	.29	.73	A	1.21	1.30	2.42		1.16
	B		1.04	.26	.33	.76	B		1.07	2.00		1.41
	C			.61	.13	.27	C			1.86		1.52
	D				.26	.32	D					2.86
	F						F					

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* Signinifcance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP IV

SCALE		t STATISTICS						F STATISTICS				
ML		B	C	D	F	W		B	C	D	F	W
	A	.37	.24	.06	1.00	.37	A	2.13	2.70	2.06		2.13
	B		.74	.24	1.64	.03	B		1.27	1.03		1.00
	C			.33	1.47	.74	C			1.32		1.27
	D				1.38	.23	D					1.03
	F					1.64	F					
MR		B	C	D	F	W		B	C	D	F	W
	A	.54	.61	3.14*	2.25*	1.78*	A	2.04	1.72	3.74		1.28
	B		.06	1.86*	1.38	.93	B		1.18	7.65		1.61
	C			1.94*	1.45	.83	C			6.47		1.36
	D				1.17	1.53	D					4.76
	F					1.35	F					
MI		B	C	D	F	W		B	C	D	F	W
	A	1.15	.81	2.15*	1.13	1.58	A	1.00	1.66	2.02		1.41
	B		.33	1.27	.67	.48	B		1.65	2.02		1.43
	C			1.81	1.01	.75	C			1.22		2.33
	D					.75	D					2.86
	F					.39	F					
MD		B	C	D	F	W		B	C	D	F	W
	A	.18	.32	.48	.25	.31	A	2.42	1.42	1.34		3.08*
	B		.21	.82	.29	.66	B		1.69	1.82		1.27
	C			.79	.13	.77	C			1.06		2.17
	D				.55	.47	D					2.30
	F					.60	F					
E		B	C	D	F	W		B	C	D	F	W
	A	1.17	2.42*	2.17*	1.98*	2.06*	A	1.16	2.13	1.75		1.56
	B		1.41	1.16	1.38	.90	B		1.85	2.02		1.35
	C			.17	.47	.65	C			3.74		1.37
	D				1.02	.38	D					2.70
	F					.86	F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP V

SCALE		t STATISTICS						F STATISTICS				
CAP		B	C	D	F	W		B	C	D	F	W
	A	1.36	1.17	.51		.99	A	2.17	1.15			
	B		.19	.84		.19	B		1.91			
	C			1.00		.36	C					
	D						D					
	F						F					
CSO		B	C	D	F	W		B	C	D	F	W
	A	1.28	1.49	.20		.70	A	2.94	4.00*			
	B		.34	.56		.85	B		1.33			
	C			.61		.86	C					
	D						D					
	F						F					
CAG		B	C	D	F	W		B	C	D	F	W
	A	1.86*	2.52*	.19		.84	A	1.49	1.14			
	B		.71	.55		.02	B		1.33			
	C			.98		.39	C					
	D						D					
	F						F					
CEC		B	C	D	F	W		B	C	D	F	W
	A	1.06	.10	.87		.23	A	1.70	4.00			
	B		1.04	1.66		.81	B		2.35			
	C			1.78		.52	C					
	D						D					
	F						F					
CAT		B	C	D	F	W		B	C	D	F	W
	A	.46	.56	.34		.06	A	2.13	3.33			
	B		.80	.07		.13	B		1.54			
	C			.38		.23	C					
	D						D					
	F						F					
CSD		B	C	D	F	W		B	C	D	F	W
	A	.89	1.67	.19		.45	A	1.64	1.66			
	B		1.14	.19		.16	B		1.01			
	C			.72		.39	C					
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP V

SCALE		t STATISTICS						F STATISTICS				
CAI		B	C	D	F	W		B	C	D	F	W
	A	1.30	.36	.37		.78	A	2.41	1.01			
	B		.72	1.28		1.91	B		2.38			
	C			.53		.93	C					
	D						D					
	F						F					
CEA		B	C	D	F	W		B	C	D	F	W
	A	.67	.19	.70		1.23	A	1.16	4.77*			
	B		.48	.93		1.41	B		5.56*			
	C			1.66		2.77*	C					
	D						D					
	F						F					
CN		B	C	D	F	W		B	C	D	F	W
	A	.96	1.81*	1.54		2.03*	A	1.72	1.77			
	B		.63	.83		1.20	B		3.03			
	C			.94		1.56	C					
	D						D					
	F						F					
CQ		B	C	D	F	W		B	C	D	F	W
	A	.70	1.12	.50		.50	A	2.11	3.15			
	B		.75	1.09		1.09	B		1.49			
	C			1.69		1.69	C					
	D						D					
	F						F					
CI		B	C	D	F	W		B	C	D	F	W
	A	.80	.16	.46		.97	A	2.44	1.96			
	B		.48	.58		.91	B		1.25			
	C			.38		.74	C					
	D						D					
	F						F					
CP		B	C	D	F	W		B	C	D	F	W
	A	.87	2.75*	2.06*		3.58*	A	4.35*	5.56*			
	B		1.50	.70		1.43	B		1.25			
	C			.05		.58	C					
	D						D					
	F						F					

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* Significance at the .05 level.

LEARNING STYLES INVENTORY

t AND F STATISTICS - SUB-GROUP V

SCALE		t STATISTICS						F STATISTICS				
		B	C	D	F	W		B	C	D	F	W
ML	A	.49	.36	.86		1.30	A	1.01	1.32			
	B		.07	1.07		1.52	B		1.30			
	C			1.14		1.63	C					
	D						D					
	F						F					
MR	A	1.62	1.29	1.43		.18	A	1.43	1.01			
	B		.20	.58		.48	B		1.42			
	C			.77		.44	C					
	D						D					
	F						F					
MI	A	1.53	.19	.89		.24	A	1.23	1.12			
	B		1.10	.20		.39	B		1.11			
	C			.73		.13	C					
	D						D					
	F						F					
MD	A	.42	1.32	.47		1.30	A	1.28	1.88			
	B		1.06	.72		1.66	B		1.47			
	C			1.42		2.52*	C					
	D						D					
	F						F					
E	A	1.63	3.84*	3.35*		1.08	A	3.03	1.05			
	B		1.23	1.38		.06	B		3.14			
	C			1.47		.80	C					
	D						D					
	F						F					

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* Significance at the .05 level.

APPENDIX X

TEACHING STYLES INVENTORY RESULTS

TEACHING STYLES INVENTORY RESULTS

SCALE	INSTRUCTOR ONE SCORE	INSTRUCTOR TWO SCORE	INSTRUCTOR THREE SCORE	INSTRUCTOR FOUR SCORE	INSTRUCTOR FIVE SCORE	INSTRUCTOR SIX SCORE
CAP	15	16	18	16	15	18
CSO	13	7	9	6	8	6
CAG	11	11	10	13	17	13
CEC	11	16	13	15	10	13
CAT	11	11	16	12	6	12
CSD	9	19	10	7	10	7
CAI	17	13	10	13	16	18
CEA	13	7	14	18	18	13
CN	8	12	7	12	5	1[illegible]
CQ	13	11	18	15	19	8
CI	9	14	11	10	14	19
CP	17	13	13	13	12	12
ML	15	16	13	10	15	11
MR	14	13	15	12	9	9
MI	14	16	13	13	13	15
MD	7	11	9	15	13	15
E	21	19	23	23	8	13

APPENDIX XI

PROBABILITY DISTRIBUTIONS OF THE LEARNING STYLES INVENTORY AND TEACHING STYLES INVENTORY

PROBABILITY DISBRIBUTIONS OF INSTRUCTOR ONE AND HIS STUDENTS

SCALE	INSTRUCTOR ONE $P(Z_i)$	STUDENTS GRADE A $P(X_i)$	STUDENTS GRADE B $P(X_i)$	STUDENTS GRADE C $P(X_i)$	STUDENTS GRADE D $P(X_i)$	STUDENTS GRADE F $P(X_i)$	STUDENTS GRADE W $P(X_i)$
CAP	.0688	.0629	.0645	.0564	.0579	.0595	.0637
CSO	.0596	.0386	.0406	.0433	.0426	.0352	.0384
CAG	.0505	.0643	.0614	.0568	.0549	.0517	.0491
CEC	.0505	.0678	.0661	.0706	.0687	.0687	.0673
CAT	.0505	.0552	.0567	.0446	.0392	.0562	.0486
CSD	.0413	.0539	.0500	.0523	.0549	.0430	.0461
CAI	.0780	.0695	.0756	.0627	.0672	.0691	.0613
CEA	.0596	.0552	.0505	.0642	.0601	.0614	.0627
CN	.0367	.0412	.0425	.0488	.0482	.0498	.0553
CQ	.0596	.0662	.0723	.0674	.0657	.0691	.0596
CI	.0413	.0633	.0539	.0504	.0530	.0554	.0524
CP	.0780	.0629	.0645	.0584	.0571	.0462	.0515
ML	.0688	.0497	.0461	.0426	.0552	.0485	.0480
MR	.0642	.0665	.0603	.0615	.0743	.0659	.0673
MI	.0642	.0698	.0694	.0642	.0478	.0522	.0568
MD	.0321	.0477	.0572	.0562	.0467	.0531	.0457
E	.0963	.0646	.0684	.1017	.1068	.1291	.1262

PROBABILITY DISTRIBUTIONS OF INSTRUCTOR TWO AND HIS STUDENTS

SCALE	INSTRUCTOR TWO $P(Z_i)$	STUDENTS GRADE A $P(X_i)$	STUDENTS GRADE B $P(X_i)$	STUDENTS GRADE C $P(X_i)$	STUDENTS GRADE D $P(X_i)$	STUDENTS GRADE F $P(X_i)$	STUDENTS GRADE W $P(X_i)$
CAP	.0731	.0617	.0638	.0552	.0654	.0553	.0592
CSO	.0320	.0371	.0376	.0400	.0469	.0289	.0412
CAG	.0503	.0599	.0553	.0553	.0515	.0625	.0470
CEC	.0731	.0656	.0672	.0652	.0587	.0697	.0648
CAT	.0503	.0501	.0477	.0443	.0384	.0433	.0462
CSD	.0686	.0448	.0475	.0441	.0502	.0384	.0494
CAI	.0594	.0706	.0649	.0644	.0667	.0733	.0602
CEA	.0320	.0607	.0644	.0649	.0684	.0613	.596
CN	.0548	.0480	.0462	.0585	.0537	.0541	.0557
CQ	.0503	.0650	.0666	.0602	.0595	.0637	.0585
CI	.0640	.0579	.0579	.0494	.0553	.0553	.0528
CP	.0594	.0551	.0535	.0499	.0595	.0433	.0479
ML	.0731	.0531	.0487	.0486	.0519	.0397	.0487
MR	.0594	.0664	.0675	.0694	.0688	.0709	.0666
MI	.0457	.0593	.0584	.0519	.0536	.0493	.0530
MD	.0503	.0474	.0499	.0484	.0473	.0565	.0462
E	.0686	.0978	.1027	.1302	.1043	.1346	.1428

PROBABILITY DISTRIBUTIONS OF INSTRUCTOR THREE AND HIS STUDENTS

SCALE	INSTRUCTOR THREE $P(Z_i)$	STUDENTS GRADE A $P(X_i)$	STUDENTS GRADE B $P(X_i)$	STUDENTS GRADE C $P(X_i)$	STUDENTS GRADE D $P(X_i)$	STUDENTS GRADE F $P(X_i)$	STUDENTS GRADE W $P(X_i)$
CAP	.0811	.0618	.0600	.0587			.0672
CSO	.0405	.0411	.0341	.0415			.0428
CAG	.0450	.0484	.0518	.0485			.0349
CEC	.0586	.0683	.0659	.0667			.0646
CAT	.0721	.0525	.0506	.0464			.0419
CSD	.0450	.0492	.0482	.0511			.0463
CAI	.0450	.0586	.0435	.0555			.0524
CEA	.0631	.0594	.0694	.0625			.0690
CN	.0315	.0500	.0541	.0569			.0725
CQ	.0811	.0578	.0671	.0607			.0541
CI	.0495	.0598	.0235	.0589			.0445
CP	.0586	.0508	.0553	.0473			.0384
ML	.0586	.0504	.0553	.0504			.0541
MR	.0676	.0639	.0682	.0722			.0629
MI	.0586	.0610	.0588	.0497			.0568
MD	.0405	.0444	.0294	.0415			.0358
E	.1036	.1225	.1647	.1413			.1616

PROBABILITY DISTRIBUTIONS OF INSTRUCTOR FOUR AND HIS STUDENTS

SCALE	INSTRUCTOR FOUR $P(Z_i)$	STUDENTS GRADE A $P(X_i)$	STUDENTS GRADE B $P(X_i)$	STUDENTS GRADE C $P(X_i)$	STUDENTS GRADE D $P(X_i)$	STUDENTS GRADE F $P(X_i)$	STUDENTS GRADE W $P(X_i)$
CAP	.0717	.0607	.0579	.0555	.0526	.0532	.0609
CSO	.0269	.0449	.0430	.0414	.0404	.0403	.0404
CAG	.0583	.0499	.0490	.0525	.0503	.0421	.0469
CEC	.0673	.0648	.0682	.0653	.0678	.0704	.0649
CAT	.0538	.0505	.0468	.0483	.0350	.0601	.0487
CSD	.0314	.0516	.0464	.0484	.0490	.0429	.0465
CAI	.0583	.0570	.0575	.0576	.0573	.0421	.0551
CEA	.0807	.0611	.0673	.0602	.0689	.0609	.0660
CN	.0538	.0525	.0588	.0624	.0725	.0661	.0617
CQ	.0673	.0698	.0611	.0570	.0444	.0704	.0548
CI	.0448	.0438	.0438	.0486	.0561	.0352	.0476
CP	.0583	.0542	.0515	.0466	.0374	.0335	.0512
ML	.0448	.0525	.0577	.0512	.0444	.0446	.0563
MR	.0538	.0713	.0674	.0651	.0772	.0670	.0682
MI	.0583	.0499	.0494	.0490	.0479	.0532	.0512
MD	.0673	.0466	.0434	.0492	.0409	.0412	.0404
E	.1031	.1192	.1306	.1418	.1578	.1768	.1392

PROBABILITY DISTRIBUTIONS OF INSTRUCTOR FIVE AND HIS STUDENTS

SCALE	INSTRUCTOR FIVE $P(Z_i)$	STUDENTS GRADE A $P(X_i)$	STUDENTS GRADE B $P(X_i)$	STUDENTS GRADE C $P(X_i)$	STUDENTS GRADE D $P(X_i)$	STUDENTS GRADE F $P(X_i)$	STUDEN GRADE $P(X_i$
CAP	.0721	.0617	.0607	.0596	.0626	.0629	.0587
CSO	.0385	.0358	.0393	.0380	.0470	.0419	.046
CAG	.0817	.0643	.0553	.0530	.0480	.0419	.050
CEC	.0481	.0712	.0659	.0657	.0609	.0819	.065
CAT	.0288	.0561	.0490	.0489	.0424	.0381	.051
CSD	.0481	.0488	.0475	.0503	.0520	.0552	.051
CAI	.0769	.0573	.0655	.0633	.0652	.0571	.058
CEA	.0865	.0608	.0591	.0549	.0590	.0781	.060
CN	.0240	.0539	.0510	.0610	.0623	.0857	.052
CQ	.0913	.0622	.0578	.0571	.0497	.0400	.062
CI	.0673	.0596	.0591	.0551	.0537	.0686	.052
CP	.0577	.0574	.0531	.0443	.0530	.0454	.054
ML	.0721	.0526	.0493	.0494	.0434	.0705	.050
MR	.0433	.0639	.0645	.0678	.0702	.0629	.068
MI	.0625	.0630	.0594	.0519	.0484	.0610	.060
MD	.0625	.0535	.0479	.0485	.0566	.0343	.042
E	.0385	.0678	.1157	.1313	.1256	.0857	.113

PROBABILITY DISTRIBUTIONS OF INSTRUCTOR SIX AND HIS STUDENTS

SCALE	INSTRUCTOR SIX $P(Z_i)$	STUDENTS GRADE A $P(X_i)$	STUDENTS GRADE B $P(X_i)$	STUDENTS GRADE C $P(X_i)$	STUDENTS GRADE D $P(X_i)$	STUDENTS GRADE F $P(X_i)$	STUDE GRADE $P(X_i$
CAP	.0851	.0592	.0660	.0572	.0555	.0492	.067
CSO	.0282	.0364	.0389	.0401	.0395	.0422	.041
CAG	.0610	.0631	.0549	.0556	.0511	.0580	.045
CEC	.0610	.0748	.0653	.0649	.0671	.0615	.068
CAT	.0563	.0497	.0508	.0442	.0444	.0404	.056
CSD	.0329	.0464	.0425	.0486	.0449	.0404	.045
CAI	.0851	.0723	.0645	.0626	.0600	.0633	.057
CEA	.0610	.0623	.0673	.0632	.0640	.0668	.064
CN	.0516	.0364	.0483	.0479	.0511	.0387	.053
CQ	.0376	.0753	.0589	.0545	.0680	.0510	.066
CI	.0892	.0662	.0619	.0602	.0431	.0650	.052
CP	.0563	.0656	.0566	.0462	.0511	.0562	.050
ML	.0516	.0525	.0525	.0510	.0524	.0404	.050
MR	.0423	.0600	.0694	.0618	.0666	.0562	.061
MI	.0704	.0662	.0557	.0557	.0480	.0633	.065
MD	.0704	.0548	.0483	.0501	.0462	.0510	.048
E	.0610	.0689	.0983	.1262	.1471	.1564	.106

APPENDIX XII

CHI-SQUARE STATISTICS USED IN THE "GOODNESS OF FIT TEST" COMPARISON OF "LEARNING STYLES" AND "TEACHING STYLES"

CHI-SQUARE STATISTICS

	INSTRUCTOR #1	INSTRUCTOR #2	INSTRUCTOR #3	INSTRUCTOR #4	INSTRUCTOR #5	INSTRUCTOR #6
Grade A	13.747	15.757	9.403	11.268	29.331	17.761
Grade B	13.799	17.726	19.416	10.926	56.457	18.984
Grade C	13.715	24.947	14.674	12.672	77.344	29.236
Grade D	11.218	20.797		23.748	72.818	46.018
Grade F	16.742	29.276		25.069	67.403	44.206
Grade W	13.445	23.712	27.358	12.670	56.405	25.679

APPENDIX XIII

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR A AND B

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP						t			t			
CSO		F			t		F		F			
CAG							t					
CEC			F			t						
CAT							F					
CSD						F						
CAI				F			t			F		
CEA							t		F			
CN						t		t				
CQ												
CI			t F									
CP						F					F	F
ML												
MR						t						
MI												
MD												
E				F	t F	t	t	t	F			t

Legend: t - significant t statistic
F - significant F statistic
Ij - Instructor j
Gj - Sub-group j
G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR A AND C

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP	F											
CSO		t			F	F	t F				F	t
CAG		F		F							t	F
CEC												
CAT	t							t				t
CSD						F						
CAI				F			t	F				F
CEA	t	t									F	t
CN		t		t		t	t	t	t		t	t
CQ				t			F					t
CI	t		t									t
CP						t					t F	t
ML												
MR												
MI			t		F							t
MD	t						t					
E	t	t			t	t	t	t		t	t	t

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR A AND D

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP		F							t_F			F
CSO		t			t	F		t	t_F			t_F
CAG		t			t				t			t
CEC		F										
CAT	t_F	t			t			t	t			t
CSD												
CAI								t_F	t			F
CEA		t_F			F				t	t		t
CN				t		t		t		t		t
CQ				t	F			t				
CI		F		F		t						
CP		F		t_F		t					t	
ML					F							
MR	t									t		t
MI	t_F					t		F	t	t		t_F
MD												
E	t				t	t			t	t	t	t

Legend: t - significant t statistic

F - significant F statisitc

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR A AND F

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP										t		
CSO												
CAG		F			F							
CEC		F						t				t
CAT				t								
CSD												
CAI												
CEA					t							t
CN				t	t			t				t
CQ												
CI				F								
CP	t			t				t				t
ML				F	t							
MR										t		
MI	t F							F				F
MD					F							
E	t			t		t		t		t		t

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR A AND W

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP						t	F					t
CSO		t			t F	t			t F			t
CAG	t	t		F	t	t	t	F	t	t		t
CEC										F		
CAT									F			F
CSD		t				F				t		
CAI		t					t		t			t
CEA	t									t		t
CN	t F	t	t		F	t	t	t	t	t		t
CQ				t					t			
CI							F					
CP						t	t				t	t
ML	F											
MR										t		
MI												
MD										F		
E	t F	t			t	t	t	t	t	t		t

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR B AND C

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP			t	F			t		t			t
CSO					F							
CAG		F					t					F
CEC	t		F						t			
CAT	t						F		t			
CSD		F				tF	t					t
CAI	t						t			F		
CEA	t	F		t			t		F		F	
CN	F	t			t	t			t			t
CQ												
CI			t	F	F			F	t			
CP					t	t						t
ML												
MR			F						t			
MI					t							t
MD				F								
E	t	t		F		t			t			t

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR B AND D

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP		F							F			
CSO		t			t			t	t			t
CAG									t			
CEC		t_F				t		t				
CAT	t	t						t	t			t_F
CSD					F					t		t
CAI								t	t			
CEA	t	F			F				t_F			F
CN					t				t	t		t
CQ					F	t				t		
CI		F		F		t			t			
CP				F								
ML	t				F			F				
MR	t									t		t_F
MI	t				t				t			t
MD												
E	t					t			t_F			t

Legend: t - significant t statistic
F - significant F statistic
Ij - Instructor j
Gj - Sub-group j
G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR B AND F

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP										t		
CSO												
CAG		F			t							
CEC		F										t
CAT				t								
CSD						F						
CAI				t								
CEA	t											F
CN	F				t							t
CQ												
CI				F								
CP	t			t								t
ML				F	t			F				
MR												
MI	t F											F
MD					F							
E	t F			t		t			t F			t

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR B AND W

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP								t				
CSO		t			t_F				t			t
CAG	t	t		F		t		t	t			t
CEC	t		F									
CAT					F		F		F			F
CSD							t		t			
CAI	t								t			t
CEA	t								F			
CN	t_F	t							t_F	t		t
CQ	t											
CI			t									
CP	t								t			t
ML												
MR	t											
MI	t					t						
MD	t						t					
E	t_F	t							t_F			t

Legend:
t - significant t statistic
F - significant F statistic
Ij - Instructor j
Gj - Sub-group j
G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR C AND D

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP		t_F							t_F			
CSO					t			t				
CAG		t							t			
CEC		t_F							t_F	F		F
CAT		t						t				t_F
CSD										t		
CAI		F						t				
CEA					F							F
CN												
CQ					F	t		t				
CI						t						
CP				F								t
ML	t				F			F	t			
MR	t									t		
MI	t								t			F
MD												
E												

Legend:
t - significant t statistic
F - significant F statistic
Ij - Instructor j
Gj - Sub-group j
G_T _ Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR C AND F

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP	F									t		
CSO		t										
CAG		F		t								
CEC		F						t				t
CAT				t								
CSD								t				t
CAI				t								
CEA					t							
CN					t							
CQ				t								
CI				t F								
CP	t							t				
ML				F	t			F				
MR												
MI	t F							F				F
MD					F							
E												

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR C AND W

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP	t	t	t			t	t F	t	t			t
CSO					t				t			
CAG	t	t		t		t	t	t	t F	t		t
CEC									t			
CAT						t				F		
CSD		t		F								
CAI						F						
CEA		t									t	
CN			t		t							
CQ			F			t	t					
CI	F						F					
CP					t				t			
ML	t											
MR	t											
MI					t		t					t
MD	t						t	F			t	t
E	t F								t F			

Legend:
t - significant t statistic
F - significant F statistic
Ij - Instructor j
Gj - Sub-group j
G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR D AND F

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP		t							F	t		F
CSO		t						t				t
CAG		F										
CEC		F			t			t				t
CAT				t				t				t
CSD										t		t
CAI				t								
CEA					t							
CN					t					t		
CQ				t				t		t		
CI				t		t			t			
CP	F			F	t			t				t
ML												
MR												
MI	F								t			t
MD					F							
E												

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTICS

COMPARISON PAIR D AND W

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP	t	F				t			F			
CSO								t				
CAG										t		
CEC		t_F							F	F		F
CAT	t_F	t_F						t	t_F			t_F
CSD										t		
CAI						F		t				t
CEA					F							F
CN					t							
CQ					t_F			t				
CI		F										
CP				F								
ML				F				F				
MR				F								
MI	F				t	t			t			t
MD					t			t_F				
E		t										

Legend: t - significant t statistic

F - significant F statistic

Ij - Instructor j

Gj - Sub-group j

G_T - Total group

TABULATION OF SIGNIFICANT "t" AND "F" STATISTIC

COMPARISON PAIR F AND W

SCALE	I_1	I_2	I_3	I_4	I_5	I_6	G_1	G_2	G_3	G_4	G_5	G_T
CAP	F					t		t		t		
CSO		t										
CAG										t		
CEC								t				
CAT				t					F			
CSD												
CAI		t		t								
CEA												
CN					t							
CQ	t			t								
CI				F								
CP	F			t				t				t
ML				F				F				
MR												
MI	F											F
MD								F				
E												

Legend: t - significant t statistic
F - significant F statistic
Ij - Instructor j
Gj - Sub-group j
G_T - Total group

SIGNATURE PAGE

I certify that I have read and am willing to sponsor this Major Applied Research Project submitted by ROY H. RAINES. In my opinion it conforms to acceptable standards and is fully adequate in scope and quality, as a Major Applied Research Project for the degree of Doctor of Education at Nova University.

John E. Roueche

John E. Roueche, MRP Advisor

I certify that I have read this Major Applied Research Project and in my opinion in conforms to acceptable standards for a Major Applied Research Project for the degree of Doctor of Education at Nova University.

Jim Chinn, Local Professional

This Major Applied Research Project was submitted to the Central Staff of the Nova University Ed.D. Program for Community College Faculty and is acceptable as partial fulfillment of the requirements for the degree of Doctor of Education.

Leland L. Medsker

Leland Medsker
Central Staff Committee Member

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